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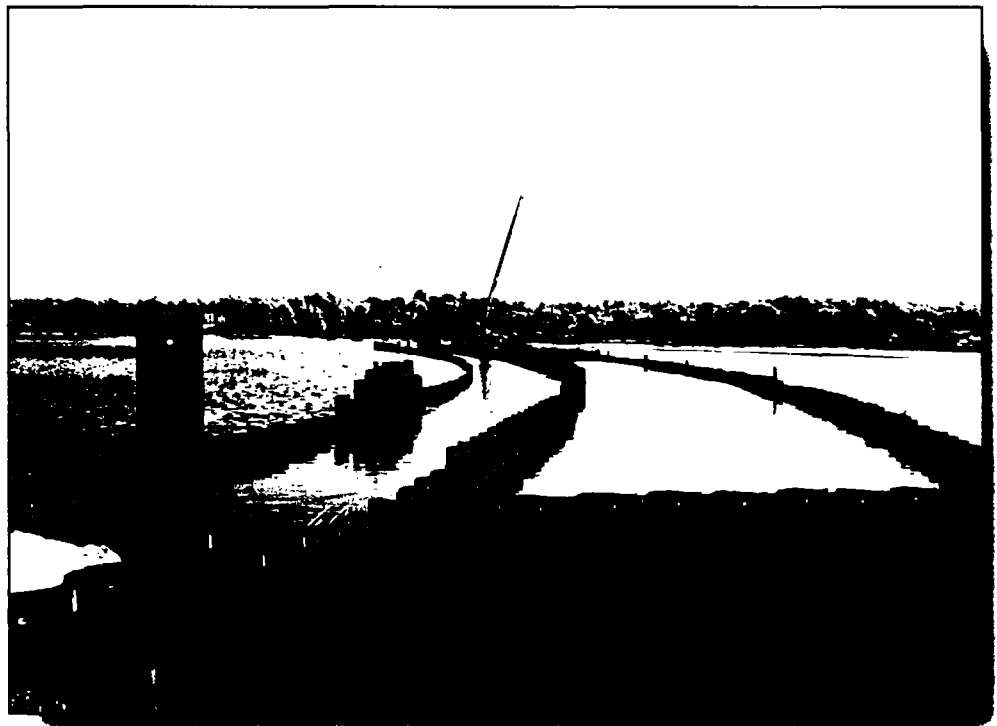


U.S. Environmental
Protection Agency

Water Quality Monitoring Summary Report

Construction of the Commonwealth Electric Cable Crossing

New Bedford Harbor Superfund Site -
New Bedford, Massachusetts



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Final
August 2003



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Letter of Transmittal

ATTENTION:

Dave Dickerson
Jim Brown
Skip Nelson
Paul L'Heureux

DATE:

4 September 2003

PROJECT REFERENCE:

New Bedford Harbor Superfund Site –
Commonwealth Electric Cable Crossing

PROJECT NUMBER:

09000-275

WE ARE SENDING YOU THE FOLLOWING:

<u>Number of Originals</u>	<u>Number of Copies</u>	<u>Description</u>
	1	Change pages to the Water Quality Monitoring Summary Report <ul style="list-style-type: none">- Executive Summary – 2 pages- Results Section pages 4-4, 4-5- Discussion Section page 5-2- Cover, spine, title page noting "Final"

REMARKS:

Greetings, Jay Mackay asked that I send you the change pages for the Commonwealth Electric summary report. Changes were made based on Jim Brown's request to make the connection between the +50 NTU criterion and toxicity testing results a little clearer. With these changes, the report moves into the "Final" status.

SIGNATURE:

Steve Wolf



**U.S. Army Corps of
Engineers**
New England District



**U.S. Environmental
Protection Agency**

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TABLE OF CONTENTS

1.0 INTRODUCTION	1-1
1.1 Site Background	1-1
2.0 CONSTRUCTION SUMMARY	2-1
2.1 Phase I Construction	2-1
2.2 Phase II Construction	2-2
3.0 WATER QUALITY MONITORING DURING CONSTRUCTION	3-1
3.1 Overview	3-1
3.2 Construction Contractor Water Quality Monitoring	3-2
3.3 USACE Water Quality Monitoring	3-3
4.0 RESULTS OF WATER QUALITY MONITORING	4-1
4.1 Overview	4-1
4.2 Water Quality Field Measurements	4-1
4.3 Biological Testing	4-3
4.4 Chemical Analyses	4-4
5.0 DISCUSSION	5-1
6.0 REFERENCES	6-1



TABLE OF CONTENTS (Continued)

List of Appendices

Appendix A: Scope of Work for Contractor and USACE Water Quality Monitoring

Appendix B: Project Photographs

Appendix C: Daily Log of Construction and Monitoring Activities

Appendix D: Monitoring Summaries Prepared During the Project

Appendix E: Results of Toxicity Testing and PCB Congener Analysis



List of Figures

Figure 1: Harbor Overview

Figure 2: Upper Harbor

Figure 3: Sheet Pile Enclosures Constructed as Part of Conduit Installation (Phase 1)

Figure 4: ENSR Monitoring Stations

Figure 5: Conceptual Approach to Data Review and Decision Making

Figure 6: 18 June 2001 – Aerial Photograph of Phase 1 Construction with Distinct Turbidity Plume

Figure 7: Mysid Shrimp (*A. bahia*) 48-Hour Survival Cumulative Test Results (April 2001 – February 2002)

Figure 8: Sea Urchin (*A. punctulata*) Fertilization Bioassay Cumulative Test Results (April 2001 – February 2002)

Figure 9: Red Alga (*C. parvula*) 48-Hour Survival Cumulative Test Results (April 2001 – February 2002)

Figure 10: Mysid Shrimp (*A. bahia*) 7-Day Survival Cumulative Test Results (April 2001 – February 2002)

Figure 11: Mysid Shrimp (*A. bahia*) 7-Day Growth Cumulative Test Results (April 2001 – February 2002)

Figure 12: Red Alga (*C. parvula*) 7-Day Cystocarp Production Cumulative Test Results (April 2001 – February 2002)

Figure 13: Total Suspended Solids Concentration Cumulative Results (April 2001 – February 2002)

Figure 14: Laboratory Measured Turbidity Cumulative Results (April 2001 – February 2002)

Figure 15: Total Dissolved PCBs Concentration Cumulative Results (April 2001 – February 2002)

Figure 16: Total Lead Concentration Cumulative Results (April 2001 – February 2002)

Figure 17: Total Copper Concentration Cumulative Results (April 2001 – February 2002)

List of Tables

Table 1: Schedule of Construction Activities

Table 2: Consideration Factors Associated with Interpretation of Monitoring Program Results

Table 3: Summary of Monitoring Events with Sampling

Table 4: Summary of Toxicity Testing Results

Table 5: Summary of Results of Chemistry Analyses



EXECUTIVE SUMMARY

Construction of the Commonwealth Electric (now NSTAR) cable crossing between Acushnet and New Bedford, Massachusetts involved installation of a cable conduit beneath the sediments of upper New Bedford Harbor. The area of the cable crossing is part of the New Bedford Harbor Superfund Site which contains sediments with elevated concentrations of PCBs and some metals. As a result, trenching of the conduit was performed within the confines of a sheet-piled enclosure to limit transport of suspended sediments (and associated contaminants) outside of the construction zone. Construction was initiated in March 2001 and was completed in March 2002. The construction was performed in two phases, with each phase including sheet-piling and conduit construction over half of the width of upper New Bedford Harbor.

A two-component water quality monitoring program was put into place to ensure that the construction operation was carried out in a manner such that the disturbance of contaminated sediments did not result in acute impacts to organisms within the water column down current of the construction and that there was not significant transport of contaminated sediments outside of the construction zone. The construction-contractor performed one level of the monitoring focusing on real-time turbidity measurements during periods of in-water work that had the potential to release contaminated sediments. A turbidity criterion of 50 NTU above background at a distance of 300 feet down-current of construction activities was specified for the project. The contractor-based monitoring also included monitoring of dissolved oxygen because of concerns that suspension of organic-rich sediments would depress dissolved oxygen level and monitoring of pH during times when concrete was added to armor the cable conduit.

The USACE performed a second level of monitoring that included both oversight as well as independent monitoring. The oversight component helped to ensure that the construction-contractor monitoring instrumentation and techniques were sufficient. The independent monitoring was performed to verify field measurements as well as to collect samples for both biological testing (acute and chronic endpoints) and chemical analyses of specific contaminants of concern. These tests were performed to verify that the 50 NTU project turbidity criterion was protective.

Overall, the sheet-pile enclosures worked well at containing suspended solids. Down current turbidity levels were unaffected or only slightly elevated (10-20 NTU) relative to background conditions during most aspects of the construction. An exceedence of the project-specific turbidity criterion was noted on three occasions during Phase I of the project; two were related to propwash during equipment positioning at the lower stages of the tide, and one was related to high suspended solids water exiting through a gap in the sheet-pile wall during conduit trench excavation. In all three instances, real-time monitoring identified the exceedence quickly, and corrective actions were taken to reduce the release of suspended solids. A 2-hour window around high tide was set for major equipment positioning to limit propwash effects, and supplemental silt curtains were placed around potential suspended sediment release points from the sheet-piled enclosure.



The chemical and biological testing verified that construction was being carried out in a manner that did not significantly impact the environment. The chemical analyses revealed that slightly increased concentrations of total copper and lead and dissolved PCBs were associated with the limited increases in turbidity that were occasionally noted 300 feet down current of construction activities. The biological testing revealed no acute impacts associated with the construction. A limited potential chronic effect was noted on one occasion when dredging occurred outside of the sheet-piled enclosure. During this event, turbidity values approached the 50 NTU criterion at the 300-foot down current location. As a result of the elevated turbidity, samples were collected at this location (300 feet down current of the dredging) for toxicity testing. This event (dredging outside of the sheet-piled enclosure) only occurred during one 2-hour period over the entire project.

In summary, the monitoring revealed that the specialized construction techniques were effective at limiting the release of sediment-related contaminants, and that there were no significant environmental impacts associated with the construction project. The two-tiered monitoring provided an efficient mechanism to ensure that project environmental objectives were achieved. Monitoring self-performed by the construction contractor not only provided a nearly continuous on-site presence, it also helped to educate the construction contractor on which activities had a greater potential for environmental impacts. The USACE oversight monitoring provided training for the construction contractor monitoring early on in the project and periodic review of instrumentation and technique later in the project. The USACE independent monitoring provided chemical analyses and biological testing to ensure that the project-specific criterion was sufficiently protective.



1.0 INTRODUCTION

1.1 Site Background

New Bedford Harbor is located approximately 50 miles south of Boston on the waters of Buzzard Bay in Bristol County, Massachusetts. The sediments in many areas of the harbor are contaminated with polychlorinated biphenyl's (PCB's) and metals, primarily from the manufacture of electrical components which occurred in the area between 1940 and the mid-1970's. Based on human health concerns and ecological risk assessments, the U.S. Environmental Protection Agency (USEPA) added New Bedford Harbor to the National Priorities List in 1982 as a designated Superfund Site and stipulated that remedial measures were required to remove PCB-contaminated sediments from the harbor.

The New Bedford Harbor Superfund Site extends from the shallow northern reaches of the Acushnet River estuary, south through the commercial harbor of New Bedford and out beyond the City's hurricane barrier into 17,000 adjacent acres of Buzzards Bay. The Superfund Site is divided into three areas – Upper, Lower, and Outer Harbor (Figure 1) defined by geographical features of the Harbor and gradients of sediment contamination. The industrial discharge of PCB contaminated waste, either directly into the harbor or indirectly through the City's sewer system, was most significant in the Upper Harbor. The location of the associated discharge and the hydrodynamics of the harbor contributed to the deposition of significant levels of PCB contamination in this area. The highest PCB concentrations or "hot-spots", which contained PCB concentrations in excess of 100,000 ppm, resided in the sediments located in the immediate area of the discharge. These "hot-spot" sediments were removed between 1994 and 1995 as part of the USEPA's first cleanup phase (U.S. EPA, 1997). The remaining sediments in the Upper Harbor, an area of approximately 190 acres, are still heavily contaminated, with PCB concentrations as high as 4,000 ppm.

Future remedial dredging efforts are planned for the Upper Harbor, but until the remedial action has been completed, any in-water construction activities that disturb the contaminated sediments require a water quality monitoring program be developed and implemented to ensure that the construction operation is carried out in a manner such that:

- The disturbance of the contaminated sediments does not result in any acute impact to organisms within the water column adjacent to the construction.
- There is not significant transport and deposition of sediments and their associated contaminants outside the construction zone to uncontaminated areas or areas that have already been remediated.

The construction activities associated with the placement of a new electrical transmission line across the Upper Harbor (Figure 2) by Commonwealth Electric (now NSTAR) required specialized



construction techniques as well as an associated environmental monitoring program. Construction was initiated in March 2001 and completed in March 2002. The monitoring revealed that the specialized construction techniques were successful at meeting the goals defined above and limiting overall impacts to water quality. This report provides a summary of the construction activities and the associated water quality monitoring programs, as well as a summary and discussion of the results of the monitoring.



2.0 CONSTRUCTION SUMMARY

In preparation for the future remedial dredging of the Upper Harbor, replacement of the Commonwealth Electric (now NSTAR) electrical power cables crossing the Upper Harbor was required. The existing cables fanned out from a sub-station in the Town of Acushnet (located to the east) and transited across the Upper Harbor (directly on the harbor bottom) to multiple termination points along the City of New Bedford side of the Harbor. In addition to updating the overall transmission line, the project involved consolidating the new cables into a conduit bundle located along a single fairway across the Upper Harbor (Figure 2). The design included placement of the conduit below the Harbor bottom and armoring of the conduit with a concrete cap to protect it during planned future remedial dredging operations.

The cable replacement was designed as a cut-and-cover operation conducted behind the protection of a sheet pile cofferdam that served to isolate construction activities and limit impacts to the surrounding Harbor. The project was completed in two separate phases. Phase I began on the New Bedford side and installed the conduit out to the centerline of the channel. Phase II subsequently installed the conduit across the other half of the Harbor and completed the junction to the electrical sub-station in Acushnet. Each phase of the construction involved the installation of three parallel and continuous rows of sheet pile which defined two enclosed work areas, referred to as the conduit bay (where the conduit was ultimately installed) and the storage bay (where excavated sediments were temporarily stockpiled) (see Figure 3). The two construction phases were essentially identical in scope and included the following sequence of activities:

- Installation of the three sheet pile walls;
- Excavation of material from the conduit bay and placement into the storage bay;
- Performance of grading and placement of a stone bed within the conduit bay;
- Placement of the transmission line conduit and installation of the concrete cap over the cable conduit;
- Replacement of excavated material from the storage bay back over the armored cable conduit; and
- Removal of the sheet pile walls.

2.1 Phase I Construction

Installation of the sheet pile to construct cofferdams that formed the conduit and storage bays for Phase I construction began along the western shore of the Upper Harbor in the City of New Bedford and extended approximately 300-feet to the mid-point of the channel (Figure 3). Following installation of the sheet-pile enclosure and initial excavation, additional reinforcing beams were installed to ensure



stability of the walls. Excavation was then completed in the conduit bay. Following excavation, stone bedding was placed on the bottom of the trenched conduit bay and graded to the proper elevation. The eastern end of the Phase I conduit bay was opened and the conduit bundle (which had been pre-assembled on the Acushnet side) was floated across the Upper Harbor and into the conduit bay. Once properly aligned, the conduit bundle was sunk into position within the trench in the conduit bay. A protective concrete cap was then poured over the conduit. Excavated materials stockpiled in the storage bay were recovered and replaced over the concrete cap after which the sheet pile bulkheads of the Phase I cofferdam were removed. Phase I construction began in March 2001 and was completed in September 2001. Table 1 provides an overview of Phase 1 activities and schedule.

2.2 Phase II Construction

Phase II construction began at the eastern terminus of the Phase I alignment i.e., at the centerline of the channel, and proceeded east to the Acushnet shore (Figure 2). Construction activities were conducted in a similar fashion as those completed during the execution of Phase I with only minor modifications to account for changes in sediment properties along the eastern side of the Upper Harbor (denser sand and clay layers on the eastern side of the Harbor did not require placement of stone bedding material for the conduit). Upon completion of the trench within the Phase II conduit bay, a second conduit bundle was pulled from the Acushnet shore and fused together with the first (Phase I) conduit at the center of the channel. After alignment and placement within the trench, the Phase II conduit was armored with a concrete cap. Excavated materials stockpiled in the storage bay were then replaced over the armored conduit. Once all the sheet pile was removed, final grading was performed over the entire corridor to reduce the shoal area over the conduit. This leveling was completed using the construction barge by positioning it over the shoal area and pivoted around one spud on an outgoing tide. As the tide fell the barge would effectively smooth down the bathymetric peaks with each rotation around the spud. Phase II construction began in August 2001 and was completed in March 2002. Table 1 provides a summary of Phase II activities and schedule.



3.0 WATER QUALITY MONITORING DURING CONSTRUCTION

3.1 Overview

As described in Section 2, specific construction techniques were employed to ensure that the handling of the contaminated sediments was performed in a manner that limited the potential release of contaminants to the water column. Project-specific water quality criteria were established for three parameters noted below. The criteria were developed by the USEPA and the USACE based on a review of previous dredging and monitoring activities at the New Bedford Harbor Superfund Site and on an understanding of sediment contamination and current patterns in the vicinity of the construction.

Turbidity - A project-specific, turbidity criterion was developed as a means of gauging the potential introduction and transport of sediment-bound contaminants. The turbidity criterion was defined as 50 NTU above background at the edge of a 300-foot mixing zone around a given construction activity along the transmission line corridor.

Dissolved Oxygen - As dissolved oxygen levels typically fall to lower levels in the late summer and early fall in estuaries such as New Bedford Harbor, there was concern that the introduction of organic-rich sediments into the water column could further deplete dissolved oxygen to levels that could impact biota. Based on the expected length of construction activities over the course of the day, the project-specific criterion was set at 3 mg/L. Regular dissolved oxygen monitoring was required with increased frequency if dissolved oxygen levels dropped below 5 mg/L at the edge of the 300-foot mixing zone, with a goal of determining if the oxygen depression was a consequence of the construction.

PH - The armoring of the conduit involved pouring large amounts of concrete with associated concerns about elevated pH in the surrounding waters. The criterion was defined as a pH of 9 at the edge of the 300-foot mixing zone down current of the construction activity.

A two-component environmental monitoring program was developed to monitor against the site-specific criteria as well as to evaluate compliance with the overall environmental goals. The program included a construction-contractor component that focused on boat-based, real-time measurements with comparison against the project-specific criteria. This monitoring was performed on a daily basis during intensive in-water construction periods. The second component of the monitoring was performed by the USACE and included periodic oversight of the construction-contractor monitoring (to ensure compliance with program requirements) as well as periodic independent monitoring that included sampling for chemical analyses and biological testing (to ensure that the project-specific turbidity criteria were protective of the environment).



3.2 Construction Contractor Water Quality Monitoring

The construction contractor for the project (Modern Continental) was tasked with performing daily monitoring during all in-water construction activities. The scope of work prepared by the USACE for this monitoring is included in Appendix A. This monitoring was initially executed by a field technician from Occupational Health Incorporated (OHI), a sub-contractor to Modern Continental, but was later assumed by Modern Continental's Project Health and Safety Officer. The monitoring primarily focused on the field measurement of turbidity, with supplemental field measurement of dissolved oxygen (DO). The field monitoring was later expanded to include pH during the placement of the concrete cap over the conduit bundle. A limited number of water samples were also collected for comparative analysis of total suspended solids.

Monitoring was required for all in-water work including sheet pile installation and removal, trench excavation and covering, and support vessel activity. Turbidity monitoring included measurements at a reference station located 1000 feet up-current of the construction operation and along a transect located 300 feet down-current of the operation (Figure 2). Transects were completed on a regular half-hour schedule until it was determined that a particular construction activity could be completed with minimal impacts to water quality. The monitoring frequency was then set to a 2 hour frequency. Three water samples were collected for TSS analysis during the course of each monitoring day during the initial portion of Phase I. During the remainder of the project, the requirement for the collection of TSS samples was linked to turbidity criterion exceedences. Field data were recorded on data sheets and forwarded to the USACE field office in New Bedford each day.

Prior to the start of construction activities the positions of the 300-foot mixing zone boundary (north of the construction alignment for the flood tide and south for the ebb tide) were surveyed and marked with a series of numbered yellow surface floats anchored in place. Similarly, single yellow floats were positioned at points 1000 feet north and south of the construction alignment to serve as reference (background) stations. Daily monitoring was performed using a Horiba Water Quality Checker. A backup unit was available on site. The instrument was calibrated each day before field monitoring and post-calibrated after each day in compliance with manufacturer's instructions to ensure that quality data were being recorded; a file of calibration records was maintained on-site. The Horiba instrument was attached to an adjustable pole-mount bracket affixed to the monitoring vessel (14' aluminum Jon-boat). The meter was lowered to the approximate mid-depth of the water column to record field data. The range of observed turbidity measurements was recorded along the 300-foot mixing zone transect, and the location of the maximum value was marked on the field log sheets. The complete suite of water quality parameters (temperature, salinity, dissolved oxygen, pH (only during concrete placement)) were recorded at the point of maximum turbidity.

The collection of TSS samples was conducted using a 12-volt submersible pump, transferring samples directly to 1-liter polyethylene bottles that were then properly labeled and placed on ice. Woods Hole Group Laboratories analyzed the TSS samples.



3.3 USACE Water Quality Monitoring

The USACE and the USEPA developed an environmental monitoring program to provide oversight of the contractor-based monitoring and to perform independent monitoring and sampling for chemical analysis and biological testing. The scope of work for this monitoring program is included in Appendix A, and a summary is provided below. ENSR International performed the monitoring under contract to the USACE. ENSR was supported by CR Environmental for vessel services and Woods Hole Group and Environmental Services, Inc. (ESI) for laboratory services.

Environmental Oversight of Construction Contractor

Oversight of the construction contractor's environmental monitoring was performed throughout the construction period with increased frequency during startup and weekly during much of the remainder of the project. The oversight included checking the performance of the water quality meter, review of calibration records and field data sheets, and accompanying the construction contractor's field technician during boat-based monitoring to provide guidance on sampling methodology. Any issues identified with either sampling methodologies or observed water column effects were reported to Modern Continental and the USACE for further review.

Independent Environmental Monitoring

An independent monitoring program, separate from the construction contractor monitoring, was performed during the project to provide an more in-depth assessment of potential water quality impacts. The monitoring program was structured to be more intensive in scope and frequency during Phase I given the uncertainty of the water column effects and the greater quantities of silt and higher PCB concentrations that were being handled along the Phase I alignment. The monitoring included the following three components:

- Detailed turbidity monitoring to assess construction operations or techniques that could potentially impact water quality.
- Collection of water samples in the surrounding Upper Harbor waters for biological testing and chemical analysis to assess the protectiveness of the 50 NTU turbidity criterion established for the project.
- Collection of water samples from waters impounded within the sheet pile cofferdam for biological testing and chemical analysis to determine if the sheet pile could be removed and/or the water could be released without causing water quality/biological impacts.

Turbidity measurements were performed using an optical backscatter turbidimeter with an in-water sensor and direct surface readout to a laptop computer. Supplemental water quality measurements were performed using a YSI multiprobe system with direct surface readout to a laptop computer. Water



samples were collected using a tube-pump setup with the intake of the pump positioned near the turbidity sensor. Analysis of the water samples included the following:

Biological Testing - Acute toxicity tests for three species - sea urchin (*Arbacia punctulata*) 1-hr sperm cell fertilization, red alga (*Champia parvula*) 48-hr exposure viability; and Mysid shrimp (*Americamysis bahia*) 48-hr survival. Chronic tests for two species - red alga (*Champia parvula*) 5-day reproduction; and Mysid shrimp (*Americamysis bahia*) 7-day survival and growth.

Chemical Testing - Total suspended solids (TSS), total copper and lead, and dissolved PCBs.

Initially, monitoring levels were established that specified the number of monitoring days and sampling requirements during a given stage of the construction. Construction techniques and schedules were modified as the project progressed, and the monitoring program evolved based on these changes and the results of the monitoring. The original scope of work for the effort is included in Appendix A. Specific sampling and laboratory methodologies are detailed in the "Sampling and Analysis plan and Quality Assurance Project Plan for New Bedford Harbor, Pre-Design Testing, Characterization and Monitoring Studies" (ENSR, 2001).

Each monitoring day included detailed turbidity measurements in the vicinity of the construction operation as well as along transects across the harbor located 300 feet down current of the construction operation. Sampling was focused on one tidal condition (ebb or flood) for the day. For ebb tide conditions, a grab sample was collected at the ebb tide reference location (EREF), and time-composited samples were collected at a station 300 feet down current of the construction (NBCE1) and further down current at the Coggeshall St. Bridge (NBCE2). Station locations are presented in Figure 4. For flood tide conditions, a grab sample was collected at the flood tide reference location (FREF), and a time-composited sample was collected at 300 feet down current of the construction (NBCE3). For both the ebb and flood sampling, the 300-foot down current stations were positioned where maximum turbidity values were measured. Given the shallow water depth (averaging 5 to 6 feet), samples were collected at mid depth within the water column.

For monitoring events designed to evaluate the water impounded within the sheet piled cofferdam, water samples were collected directly within the sheet-piled enclosure or were collected from water exiting the enclosed area at the ends or at joints on the falling tide (when the water level within the enclosed area was higher than that in the surrounding harbor).

A tiered approach was used in defining what analyses to perform on the collected water samples and interpreting the results. Toxicity measures formed the basis of environmental impact decision-making during the construction phase. Overall test results were expressed as a ratio of the results from a given down current station relative to the appropriate reference (background) location. The conceptual approach of the testing and decision-making process is presented in Figure 5. Threshold levels that were considered as part of the data review process are presented in Table 2. A test result ratio of 80%



(e.g. survival of the test organism in water from the down current location was 80% that of survival in water from the reference location) was defined as an indication of a potentially significant water quality impact.

Water quality results were available from 24 hours to 1 week after sampling depending upon the specific test/analysis requirements and relevance to ongoing construction activities. Field and laboratory data were posted to a password-protected web site for review and transfer.



4.0 RESULTS OF WATER QUALITY MONITORING

4.1 Overview

The contractor-based monitoring was performed throughout the project during in-water construction activities that had the potential to impact water quality. A daily log of construction activities and associated monitoring results is provided in Appendix C. The USACE monitoring program included an increased frequency of independent monitoring during Phase I and primarily oversight during Phase II. A summary of the USACE monitoring events that included sampling is provided in Table 3, and a daily log of all USACE monitoring is provided in Appendix C.

The results of the contractor-based monitoring were recorded on field logs and transmitted daily to the USACE. The results of the USACE monitoring were posted on the project web site. A series of short project updates were prepared that summarized the results of both the USACE and contractor-based monitoring. These updates are included in Appendix D.

As expected, even with the specialized techniques, the construction activities sometimes caused elevations of suspended solids (and associated turbidity) within the water column. The turbidity criterion of 50 NTU above background at a location 300 feet down current of construction was only briefly exceeded on three occasions. Concentrations of dissolved copper, lead, and PCBs were also somewhat elevated (relative to background) 300 feet down current of the construction. The toxicity testing revealed no acute impacts associated with the construction, and only one limited occurrence of a potential chronic impact associated with the construction. The results of each type of monitoring are summarized below.

4.2 Water Quality Field Measurements

Turbidity

The results of daily turbidity monitoring performed by the construction contractor were documented in field reports submitted at the end of each day. A summary of the daily measurement data is presented in Appendix C, and an overview of each week's monitoring results is presented in the project updates in Appendix D. Although there were some minor variations between turbidity readings measured by the two monitoring programs (construction contractor and the USACE), the overall agreement was good.

All daily turbidity monitoring included reference stations to measure background conditions against which the measurements in the construction area were compared. For monitoring performed between November and May, background turbidity values were generally less than 5 NTU and often approached 0 NTU. From June through October, a greater range of background turbidity values was



measured with an average value of approximately 10 NTU. Throughout the year, storm events with high winds or excessive precipitation could elevate background turbidity values to over 20 NTU.

Monitoring performed during much of the in-water construction revealed no discernable difference between background turbidity and turbidity measured 300 feet down current of the construction activities (for activities such as sheet pile driving or removal and some of the materials handling within the cells). Turbidity levels were sometimes elevated 10 to 20 NTU above background during equipment positioning and excavation activities, especially during ebb tide conditions (as confined water was exiting the sheet-piled enclosure) or low tide conditions (with associated shallow water depths). Turbidity levels exceeding the project criterion of 50 NTU above background 300 feet down current of construction activities were only recorded on three occasions during the project as described below:

- 20 April 2001 – USACE independent monitoring recorded spikes of elevated turbidity (approximately 90 NTU above background) 300 feet down current of the construction zone. The elevated turbidity was attributed to repositioning the materials handling barge near the time of low tide. The suspended sediments were generated by a deeper-draft high-horsepower support vessel used to reposition the barge. Once suspended, the sediments were transported down current on the ebb tide. The turbidity excursion was limited in duration. Based on this occurrence, future repositioning of barges was scheduled to occur within a 2-hour window of high tide to provide for increased water depth and limit the sediment resuspension.
- 18 June 2001 – The construction contractor monitoring recorded a well-defined turbidity plume (approximately 55 NTU above background) 300 feet down current of the construction zone during trench excavation activities (dredging material from the conduit bay and placement in the storage bay, Figure 3). The source of the turbidity plume was tracked to a small gap at the corner of the sheet pile wall, with water and suspended solids exiting on the falling tide. The turbidity plume was apparent in the aerial photographs of the project that were performed that day (Figure 6). Once the turbidity exceedence was detected, excavation was immediately halted, and a silt curtain was installed around the gap. The plume quickly dissipated, and with the silt curtain in place, excavation was able to continue with reduced down current turbidity.
- 20 August 2001 – The construction contractor monitoring recorded a limited-duration spike of elevated turbidity (approximately 60 NTU above background) at the edge of the 300-foot mixing zone. The elevation in turbidity was attributed to repositioning a barge outside of the 2-hour high tide window.

The turbidity criterion exceedences all occurred during Phase I of the project. Based on the information gained during Phase I, operational procedures (particularly vessel operations) were modified such that no turbidity criterion exceedences occurred during Phase II.



Dissolved Oxygen

Similar to turbidity, the results of daily dissolved oxygen monitoring performed by the construction contractor were documented in field reports submitted at the end of each day. A summary of the daily measurement data is presented in Appendix C, and an overview of each week's monitoring results is presented in the project updates in Appendix D. Some of the construction contractor's early monitoring data have been noted as questionable as a number of issues related to sensor handling procedures and sensor damage were identified during the periodic oversight inspections of Phase I of the project.

The results of the dissolved oxygen monitoring identified both daily and seasonal variations typical for this type of estuary. Seasonally, dissolved oxygen levels followed the normal inverse relationship with water temperature. On a daily cycle, lowest levels were typically measured early in the morning hours. This effect was most pronounced in the later summer, and some values below the project-specific criterion of 3 mg/L were noted. However, the lowest values were often recorded prior to the start of construction and at the background station at the head of the estuary. Concentrations quickly rebounded as daylight increased later in morning, and the construction activities did not appear to have any measurable effect on the normal dissolved oxygen cycling.

PH

PH measurements were only required to be performed during the period when concrete was added as armoring over the conduit bundle. A summary of the daily measurement data is presented in the "notes" column of the table in Appendix C, and a description is provide in the project updates in Appendix D. PH values as high as 9 were recorded directly within the conduit bay adjacent to where the concrete was being added. However, there were no discernable elevations of pH outside of the sheet-piled enclosure. Some of the construction contractor's early monitoring data have been noted as questionable as pH sensor damage was noted during the periodic oversight inspections of Phase I of the project.

4.3 Biological Testing

Sampling for biological testing was performed on 18 occasions to evaluate potential down current water column impacts from various construction activities as well as to evaluate the quality of impounded water prior to release. All sample sets were tested for acute effects, and nine of the sample sets were additionally tested for chronic effects. The dates of sample collection and the associated construction activities are presented in Table 3. Results of the testing are presented in Table 4 and in Figures 7 through 12. A complete set of the results is provided in Appendix E.

The acute toxicity tests for three species (sea urchin (*Arbacia punctulata*) fertilization, red alga (*Champia parvula*) 48-hr exposure viability; and Mysid shrimp (*Americamysis bahia*) 48-hr survival) revealed no acute impacts relative to background for any of the down current monitoring stations. In



addition, no acute impacts were reported for the grab samples collected directly within the area enclosed by the sheet pile enclosure (prior to release of the water).

Chronic toxicity testing (red alga (*Champia parvula*) 5-day reproduction and Mysid shrimp (*Americamysis bahia*) 7-day survival and growth) was performed on a subset of the samples as a more sensitive indicator. The testing revealed only one instance of a potential chronic impact related to construction. On 24 July, completion of the Phase I construction required that a limited amount of dredging take place outside of the sheet-piled enclosure. During this effort, monitoring revealed that turbidity values were approaching the 50 NTU above background criterion at the 300 foot down current location, and samples were collected for toxicity testing. The results of 7-day mysid test revealed that growth was somewhat reduced at the 300 foot down current station (NBCE1) relative to background during the ebb tide monitoring (growth at the down current station was 72% of that at the reference location). The results of the 7-day *Champia* cystocarp production test were similar during the flood tide monitoring on that day (cystocarp production at the down current station (NBCE3) was 61% of that at the reference location). These data indicate a limited construction impact, likely associated with the dredging outside the sheetpile enclosure. Since this dredging was of short in duration (less than 2 hours) and not scheduled to reoccur, the effects were determined to be limited in extent and of minimal significance.

Another limited impact was noted for 7-day mysid growth for a sample collected at far field station NBCE2 on 20 June (growth at the far field station NBCE2 was 76% of that at the reference location). However, this far field station was located approximately 4000 feet down-current of the construction and elevated turbidity values were not detected beyond the immediate construction area. In addition, no chronic effects were noted at the near field station on that day. Therefore, the observed effect at NBCE2 was assumed to be unrelated to project construction activities and was likely associated with discharge from a large storm water outfall (located near NBCE2) that was active prior to the monitoring on 20 June. A low growth rate for the 7-day mysid test was also reported for station NBCE3 on 21 June. However, this result is considered to be an artifact of an elevated reported growth rate for the reference sample (potentially due to salt crystal contamination during weigh in) rather than a diminished growth rate for the down current sample.

4.4 Chemical Analyses

Water samples were collected for chemical analyses in parallel with the samples for biological testing. However, not all of the samples were analyzed, as some of the chemical testing was contingent on the observance of effects from the toxicity testing. Over the course of the project, 15 sets of samples were analyzed for TSS, dissolved PCBs, and total copper and lead, and turbidity was also measured. The dates on which the sampling took place are noted in Table 3. The results of the analyses are presented in Table 5. Results are also presented graphically in Figures 13 through 17. The results of individual PCB congener analysis are presented in Appendix E.



The results of the TSS analysis are presented in Figure 13 and indicate a small but consistent elevation of TSS at the 300-foot down current stations (NBCE1 for ebb tide and NBCE3 for flood tide) relative to background conditions at the reference station. For the farfield ebb tide station (NBCE2) located at the southern end of the Upper Harbor (Figure 4), TSS was similar to or lower than at the reference station. Laboratory measured turbidity parallels the TSS results (slightly elevated at stations NBCE1 and NBCE3 relative to background) as presented in Figure 14. These measurements and TSS results are consistent with the turbidity measurements performed in the field, and indicate that the construction operations generally resulted in a relatively small increase in suspended solids measured 300 feet down current of operations, and the elevations were well-contained within the Upper Harbor.

The results of analysis for the dissolved fraction of PCBs (expressed as the sum of the 18 NOAA congeners) are presented in Figure 15. For the majority of the sampling dates, PCB concentrations at the 300-foot down current stations are similar to background conditions at the reference station. For the sampling performed from June 19-21, 2001 dissolved PCB concentrations were noticeably elevated above background at the 300-foot down current stations. These samples were collected during the most intensive portion of trench excavation. Lowest PCB concentrations were consistently measured at the farfield station (NBCE2) at the southern extreme of the Upper Harbor. PCB concentrations in the samples collected from within the confined sheet-piled cells (labeled "cell contents") are also presented in Figure 15, and show levels within the range of those measured for the down current monitoring. It should be noted that all of the sampling revealed concentrations above the chronic water quality criteria of 0.03 ug/L indicative of the harborwide impact of contaminated sediments on water quality.

The results of the analysis for total lead are presented in Figure 16 and show a small, but consistent elevation in lead concentrations for the 300-foot down current stations relative to background. This elevation was more pronounced during the June 19-21 sampling that was performed during trench excavation. Lowest concentrations were again reported for the farfield down current station (NBCE2). All measured concentrations fell below the acute water quality criterion of 210 ug/L, and the majority fell below the chronic criterion of 8.1 ug/L (except for June 19-20 and cell content samples).

The results of the analysis for total copper are presented in Figure 17 and show a similar pattern as for lead with concentrations at the 300-foot down current stations consistently elevated above background with highest elevation in the June 19-21 period and lowest concentrations at the farfield station. Almost all measured concentrations were above the chronic water quality criterion of 3.1 ug/L, and many exceeded the acute criterion of 4.8 ug/L. However, it should be noted that total concentrations are reported, and the lack of any measured acute impacts in the parallel toxicity testing indicate that the majority of the copper was likely particulate bound and not bioavailable.



5.0 DISCUSSION

The installation of the Commonwealth Electric cable crossing provides a good example of how the use of specialized construction techniques with focused monitoring can be effective at limiting environmental impacts when working in highly contaminated sediments. The long-term monitoring of New Bedford Harbor sediments completed by the USACE (USACE, 2001) identified the sediments in the area of the cable crossing as containing elevated concentrations of PCBs and some metals and as being toxic to organisms. The construction of the cable crossing involved the installation and removal of approximately one mile of sheet-pile, dredging and storage of approximately 10,000 cubic yards of sediments, placement of stone bedding material, installation of over 1,400 feet of conduit, placement of over 4,000 cubic yards of concrete to armor the conduit, and replacement and grading of the sediments over the conduit. Based on a review of the monitoring data presented in Section 4, the project was completed without any significant environmental impacts. However, several aspects of the water quality monitoring program that supported the project are worthy of follow up discussion.

Two-Component Monitoring Program

The environmental monitoring consisted of two components. The construction contractor provided monitoring during each period of in-water construction, performing real-time measurements that focused on turbidity and also included dissolved oxygen and pH. The USACE monitoring provided oversight of the construction contractor monitoring as well as independent sampling for chemical and biological testing. Overall, this two-component program worked very well. With the construction contractor providing the monitoring, there was a daily presence for all in-water work. In addition, as the project proceeded, the construction contractor gained a greater understanding of the link between construction activities and potential water quality impacts. This led to a more proactive approach in planning construction activities and communicating with the USACE component of the monitoring.

For planning for future projects, the following challenges of the construction-contractor monitoring component should be noted. The construction contractor (Modern Continental) originally subcontracted the monitoring to another company (OHI) and later assumed the monitoring role directly. Neither company had experience with water quality monitoring, and the USACE oversight role was more one of training for much of the initial phase of the project. The construction contractor was able to provide reliable turbidity monitoring, as the sensor/instrumentation for this measurement is fairly robust. However, for the more sensitive measurements of dissolved oxygen and pH, there were a number of equipment and procedural issues identified with the construction contractor monitoring that led to the rejection of some of the data and the need for increased oversight inspection. Future projects that plan to employ the construction contractor monitoring approach should consider the expected experience level of the actual individuals who will perform the monitoring (if known) and/or should factor in sufficient training and review time into the oversight monitoring program.



Real-Time Turbidity Monitoring and Tiered Sampling Approach

Given the level of sediment contamination in the area of the construction project, there were valid concerns about potential impacts to water quality. However, given that the project required more than a year to complete, with many different components of in-water construction, a program that relied on endpoint monitoring of toxicity/water quality criteria for assessing potential impacts would have been extremely costly. The use of turbidity as an indicator of potential water quality impacts provided an efficient means to gauge the effectiveness of the specialized construction techniques. The real-time nature of the measurements also provided direct feedback on the potential impacts of each aspect of the construction operation. Periodic sampling for chemical analyses and toxicity testing provided verification of the protectiveness of the project-specific turbidity criterion (50 NTU above background at 300 feet down current of the operation).

Sources of Suspended Solids during Construction

Although no significant environmental impacts were identified during the project, construction activities were halted or modified on three occasions because the project-specific turbidity criterion had been exceeded. On one occasion, the elevated turbidity was associated with water exiting a small gap in the sheet-piled enclosure (see Figure 6). This situation was remedied through containment of suspended solids with a secondary silt curtain. On the other two occasions, the elevated turbidity was traced to propwash from support vessels used to position equipment. This situation was remedied by restricting major equipment repositioning to a 2-hour window around high tide. These instances reiterated the importance of the specialized construction techniques and operational controls at maintaining water quality.



6.0 REFERENCES

- ENSR, 2001. *Sampling and Analysis Plan and Quality Assurance Project Plan for the New Bedford Harbor Superfund Site – Pre-Design Testing, Characterization, and Monitoring Studies*. March, 2001.
- U.S. Army Corps of Engineers, 2001. *New Bedford Harbor Long Term Monitoring Survey III: Summary Report*. Prepared by ENSR under Contract No. DACW33-96-D-0004, Task Order No. 037. March, 2001.
- U.S. EPA, 1997. *Report on the Effects of the Hot Spot Dredging Operations – New Bedford Harbor Superfund Site, New Bedford, Massachusetts*. October, 1997.



Table 1 Schedule of Construction Activities

Task	Construction Schedule
Phase I	
Shore based trenching	28 March – 05 April 2001
Driving of sheetpile to construct conduit and storage bays	05 April - 15 May 2001
Excavation of material from conduit bay	18 June – 13 July 2001
Stone placement on base of conduit bay	14 July – 23 July 2001
Positioning of conduit within trench	24 July – 01 August 2001
Armoring of conduit with concrete cap	27 July – 11 August 2001
Backfilling over conduit	13 August- 20 August 2001
Removal of sheetpile	23 August – 14 September 2001
Phase II	
Driving of sheetpile to construct conduit and storage bays	18 August – 13 October 2001
Excavation of material from conduit bay	18 September – 09 November 2001 No stone bedding material added
Positioning of conduit within trench	22 October – 08 December 2001
Armoring conduit with concrete cap	10 December, 2001 – Jan 25 2002
Backfilling over conduit	25 Jan – 08 February 2002
Removal of sheetpile	08 February – 07 March 2002
Grading shoal areas over conduit crossing	07 March – 19 March 2002



Table 2 Consideration Factors Associated with Interpretation of Monitoring Program Results

Potential Input Factors For Decision-Making			
Category	Sub-Category	Type	Possible Factors to consider
Toxicity Results	Acute Toxicity	Magnitude	<i>Is biological response <50% or <80% of NBH reference station ?</i>
		Specificity	<i>Are acute toxic results observed in 1, 2, or 3 species ?</i>
		Spatial	<i>Are toxic results restricted to nearfield or both nearfield and farfield ?</i>
	Chronic Toxicity	Magnitude	<i>Is biological response <50% or <80% of NBH reference station ?</i>
		Specificity	<i>Are chronic toxic results observed in 1 or 2 species ?</i>
		Spatial	<i>Are toxic results restricted to nearfield or both nearfield and farfield ?</i>
Water Quality	Turbidity	Spatial	<i>Do field observations indicate a turbidity plume ?</i>
		Magnitude	<i>Was a high TSS value measured on sampling day ?</i>
		Observation	<i>Were there other contributing factors (e.g., weather, boat traffic) to turbidity in the Harbor ?</i>
Water Chemistry	PCBs	Magnitude	<i>Are elevated PCBs correlated with high toxicity ?</i>
	metals	Magnitude	<i>Are elevated metals correlated with high toxicity ?</i>
Construction Schedule	Daily Project	Magnitude	<i>Does day's construction event have a high probability to cause turbidity ?</i>
		Spatial	<i>Is the location of construction activity shifting or ending ?</i>



Table 3 Summary of Monitoring Events with Sampling

Date	Construction Activity	Sample Locations	Flood / Ebb	Chemistry			Toxicity	Notes
				TSS	Cu/Pb	PCB	Acute/ Chronic	
4/19/01	Driving Sheetpile	EREF NBCE1 NBCE2	EBB	X	X	X	Acute & Chronic	
4/20/01	Driving Sheetpile	EREF NBCE1 NBCE2	EBB	X	X	X	Acute & Chronic	
4/24/01	Driving Sheetpile	EREF NBCE1 NBCE2	EBB	X	X	X	Acute & Chronic	
4/27/01	Driving Sheetpile	FREF NBCE3	Flood	X	X	X	Acute	
5/3/01	Driving Sheetpile	EREF NBCE1	Ebb	X	X	X	Acute	QA split/MS/MSD PCB and Pb/Cu and equip blank PCB
5/8/01	Driving Sheetpile	EREF NBCE2	Ebb	X	Archived	Archived	Acute	
5/22/01	No activity	Grab	NA	X	X	X	Acute	Grab sample taken from water exiting cell
5/23/01	No activity	Cell composite	Ebb	X	X	X	Acute & Chronic	Composite sample taken from water exiting cell
6/19/01	Excavation	EREF NBCE1 NBCE2	Ebb	X	X	X	Acute & Chronic	PCB equipment blank, QA split for PCB and Pb/Cu
6/20/01	Excavation	EREF NBCE1 NBCE2	Ebb	X	X	X	Acute & Chronic	



Table 3 Summary of Monitoring Events with Sampling (continued)

Date	Construction Activity	Sample Locations	Flood / Ebb	Chemistry			Toxicity	Notes
				TSS	Cu/Pb	PCB	Acute/ Chronic	
6/21/01	Excavation	FREF NBCE3	Flood	X	X	X	Acute & Chronic	
6/27/01	Excavation	EREF NBCE1 NBCE2	Ebb	X	X	X	Acute	
7/10/01	Excavation	EREF NBCE1 NBCE2 Cell contents	Ebb	X	X	X	Acute & Chronic	Grab sample taken within sheetpile enclosure
7/17/01	Laying stone bedding	Cell contents	NA	X	X	X		Grab sample taken within sheetpile enclosure
7/24/01	Excavation outside cofferdam, moved conduit into cofferdam	FREF NBCE3 EREF NBCE1 NBCE2	Flood and Ebb	X	X	X	Acute & Chronic	
8/2/01	Pouring concrete near shore	Cell contents	Na	X				Grab sample taken within sheetpile enclosure
8/17/01	Backfilling material	EREF NBCE1 Cell contents	Ebb	All archived except Cell contents	All archived except Cell contents	All archived except Cell contents	Cell contents acute, others chronic archived	
8/23/01	Pulling and Driving Sheets	Cell contents	Na	X	X	X	Acute	Grab sample taken within sheetpile enclosure



Table 3 Summary of Monitoring Events with Sampling (continued)

Date	Construction Activity	Sample Locations	Flood / Ebb	Chemistry			Toxiclty	Notes
				TSS	Cu/Pb	PCB	Acute/ Chronic	
Phase II								
8/27/01	Pulling Sheets	None						Sample collection was contingent on turbidity criterion exceedence.
8/28/01	Pulling Sheets	None	Ebb					Sample collection was contingent on turbidity criterion exceedence.
9/20/01	Driving Sheets & Excavation	EREF NBCE1 NBCE2	Ebb	Archived	Archived	Archived	Acute	
2/4/02	Backfilling trench	EREF NBCE1 NCBE2 Cell contents	Ebb	Archived	Archived	Archived	Acute	
3/18/02	Grading material in estuary	None	Ebb/ Flood					Sample collection was contingent on turbidity criterion exceedence.



Table 4 Summary of Toxicity Testing Results

Test	Acute				Acute				Acute			
Type	Sea Urchin Fertilization				Red Alga 48 hour Survival				Mysid Shrimp - 48 hr Survival			
Collection Date	NBCE1	NBCE2	NBCE3	Impounded Water	NBCE1	NBCE2	NBCE3	Impounded Water	NBCE1	NBCE2	NBCE3	Impounded Water
4/19/2001	101	101			100	100			100	100		
4/20/2001	106	97			100	100			100	100		
4/24/2001	99	96			100	100			103	97		
4/27/2001			98				100				100	
5/3/2001	101				100	100			100			
5/8/2001		86				100				98		
5/22/2001				100				100				100
5/23/2001				101				100				103
6/19/2001	99	100			100	100			98	100		
6/20/2001	101	100			100	100			98	100		
6/21/2001			101				100				92	
6/27/2001		100				100				98		
7/10/2001	96	110			100	100			100	100		
7/10/2001					100	100						
7/24/2001	98	98			100	100			100	100		
7/24/2001			102				100				100	
8/17/2001				100				100				100
8/17/2001												
8/23/2001				102				100				100
9/20/2001	99	99			100	100			100	95		
2/4/2002	100	95		100	100	100		100	100	100		100

Notes:

- 1) Station ID
NBCE1 – Nearfield downcurrent ebb tide
NBCE2 – Farfield downcurrent ebb tide
NBCE3 – Nearfield downcurrent flood tide
- 2) Results for stations NBCE1, 2, 3 are expressed as a ratio of the test result for specific downcurrent station (e.g. survival) divided by the test result for the reference location
- 3) Results for the impounded water samples are expressed as a ratio of the test result for specific downcurrent station (e.g. survival) divided by the test result for the laboratory control
- 4) * Results considered biased low



Table 4 Summary of Toxicity Testing Results (continued)

Test	Chronic			Chronic			Chronic		
Type	Red Alga 7 day – Cystocarp Production			Mysid Shrimp - 7 day Survival			Mysid Shrimp - 7 day Weight (Growth)		
Collection Date	NBCE1	NBCE2	NBCE3	NBCE1	NBCE2	NBCE3	NBCE1	NBCE2	NBCE3
4/19/2001	85	73*		118	97		139	89	
4/20/2001	94	88		100	100		101	93	
4/24/2001	335	700		104	104		125	108	
4/27/2001									
5/3/2001									
5/8/2001									
5/22/2001									
5/23/2001									
6/19/2001	200	1043		98	88		95	76	
6/20/2001	827	358		97	100		83	87	
6/21/2001			156			94			54*
6/27/2001									
7/10/2001	115	107		98	98		108	87	
7/10/2001	122	92							
7/24/2001	112	108		98	100		72*	84	
7/24/2001			61*			95			88
8/17/2001									
8/17/2001									
8/23/2001									
9/20/2001									
2/4/2002									

Notes:

- 1) Station ID
NBCE1 – Nearfield downcurrent ebb tide
NBCE2 – Farfield downcurrent ebb tide
NBCE3 – Nearfield downcurrent flood tide
- 2) Results for stations NBCE1, 2, 3 are expressed as a ratio of the test result for specific downcurrent station (e.g. survival) divided by the test result for the reference location
- 3) Results for the impounded water samples are expressed as a ratio of the test result for specific downcurrent station (e.g. survival) divided by the test result for the laboratory control
- 4) * Results considered biased low



Table 5 Summary of Results of Chemistry Analyses

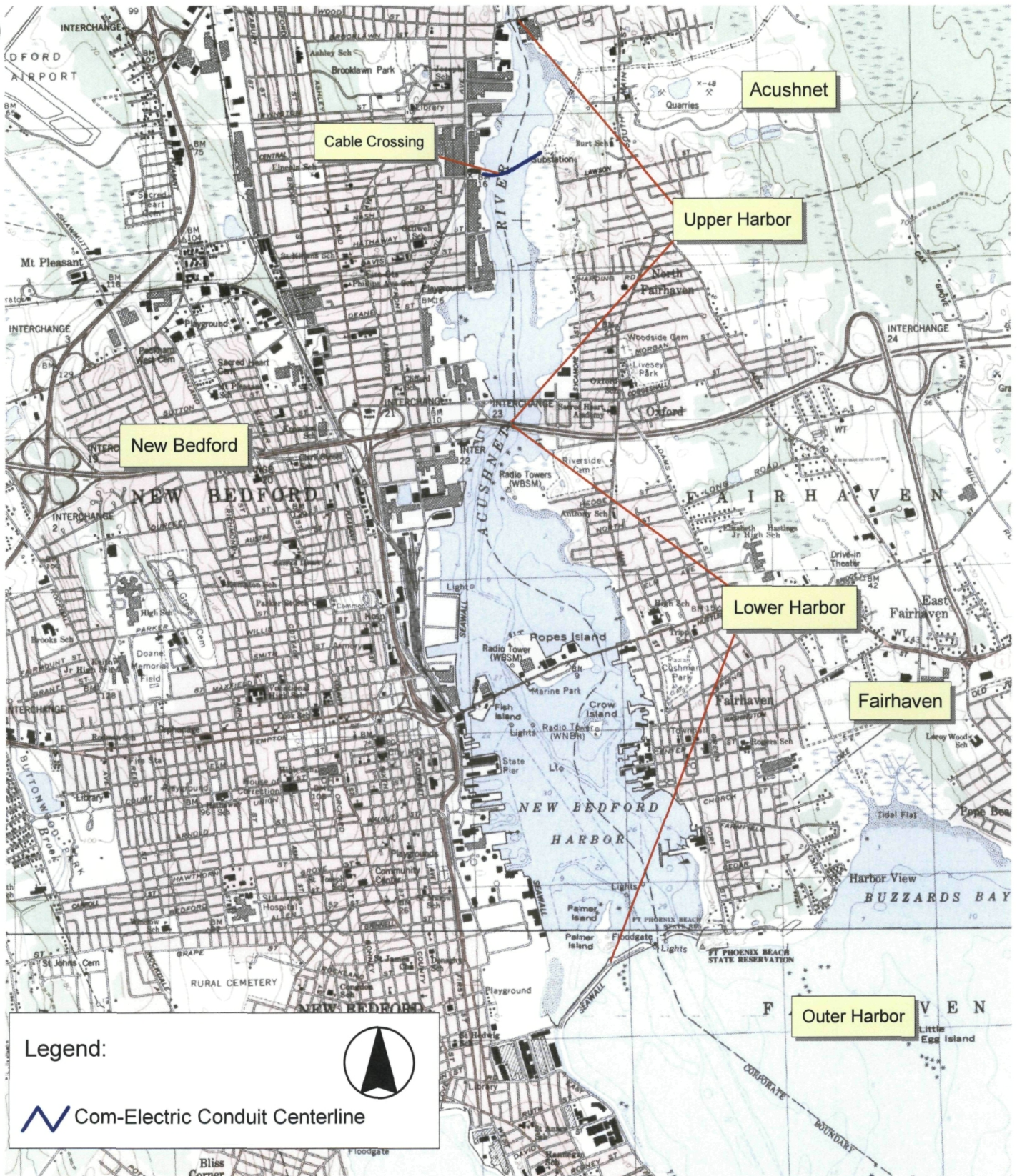
Station	EREF Ebb reference				NBCE1 Nearfield downcurrent - ebb				NBCE2 Farfield - ebb				FREF Flood reference				NBCE3 Nearfield - flood				GRAB				COMPOSITE			
Analysis	TSS	Cu	Pb	PCBs	TSS	Cu	Pb	PCBs	TSS	Cu	Pb	PCBs	TSS	Cu	Pb	PCBs	TSS	Cu	Pb	PCBs	TSS	Cu	Pb	PCBs	TSS	Cu	Pb	PCBs
Date	mg/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	mg/L	ug/L	Ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L
4/19/01	13	2.9	1.3	0.45	18	3.5	1.8	0.361	10	2.8	1.1	0.248																
4/20/01	13	4.3	2	0.358	22	8.3	5.2	0.845	14	3.9	1.5	0.236																
4/24/01	14	6.1	4.1	0.65	16	5.9	3.6	0.45	15	4.1	1.3	0.122																
4/27/01													15	4.8	2.5	0.329	22	8.5	4.9	0.391								
5/3/01	16	5.3	3.9	0.442	24	9.3	5.9	0.63																				
5/8/01	18								14																			
5/22/01																					35	6.4	7.2	0.764				
5/23/01																									44	10.4	30.7	0.645
6/19/01	7	3.7	3.4	0.309	14	12.2	20.4	2.3	10	4.2	3.3	0.277																
6/20/01	10	5.4	5.7	0.696	23	12.3	12.7	1.276	12	4.6	3.8	0.37																
6/21/01													25	6.4	4.6	0.645	34	8.6	7.5	1.111								
6/27/01	20	4.8	3.1	0.579	23	6.4	4.1	0.449	20	4.1	1.7	0.149																
7/10/01	9.1	5	3.6	0.738	13	6.7	4.8	0.634	6.3	5.5	2.9	0.315													53	10.6	13	1.869
7/17/01																					26	6.5	6.5	1.589				
7/24/01	26	5.2	3.4	0.59	27	8.9	6	0.7	18	6.4	3.4	0.332	21	7.1	5.2	0.936	29	10.1	7.1	0.936								
8/2/01																					100							
8/17/01																					260	6.9	17.6	1.339				
8/23/01																					190	13.9	35.1	2.193				

FIGURES

1



U.S. Army Corps of Engineers Com-Electric Power Line Installation, New Bedford Harbor





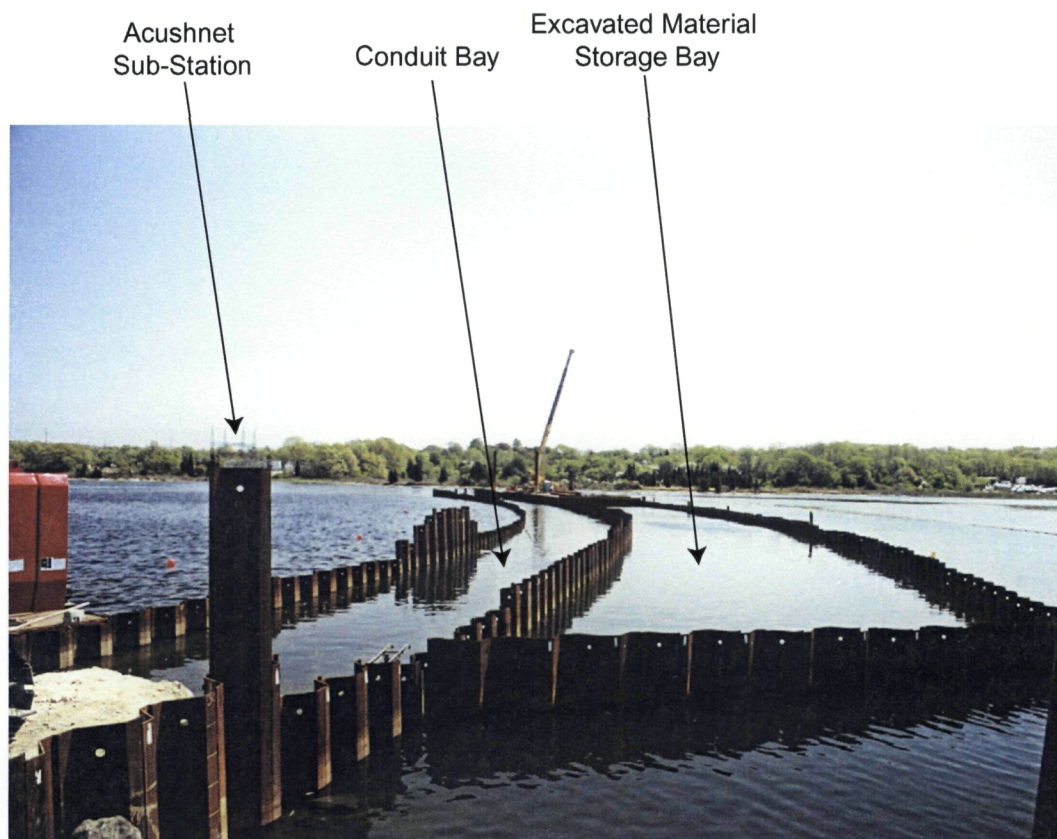
U.S. Army Corps of Engineers
Com-Electric Power Line Installation, New Bedford Harbor



Figure 2 Upper Harbor



Figure 3. Sheet Pile Enclosures Constructed as Part of Conduit Installation (Phase I)



Source: ENSR Photo

M02143_fig3



Figure 4 ENSR Monitoring Stations

500 0 500 1000 1500 Feet



Figure 5. Conceptual Approach to Data Review and Decision Making

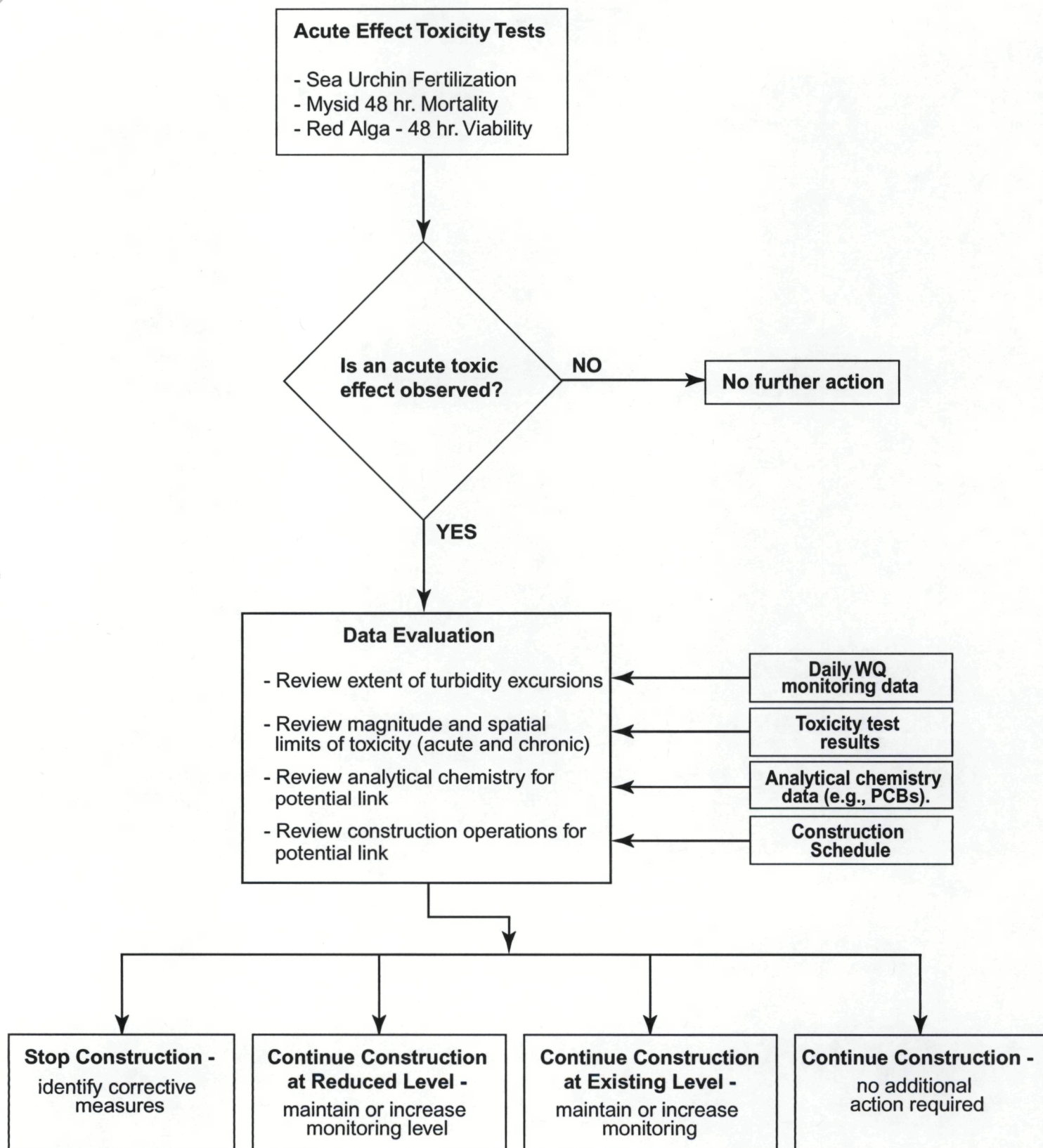
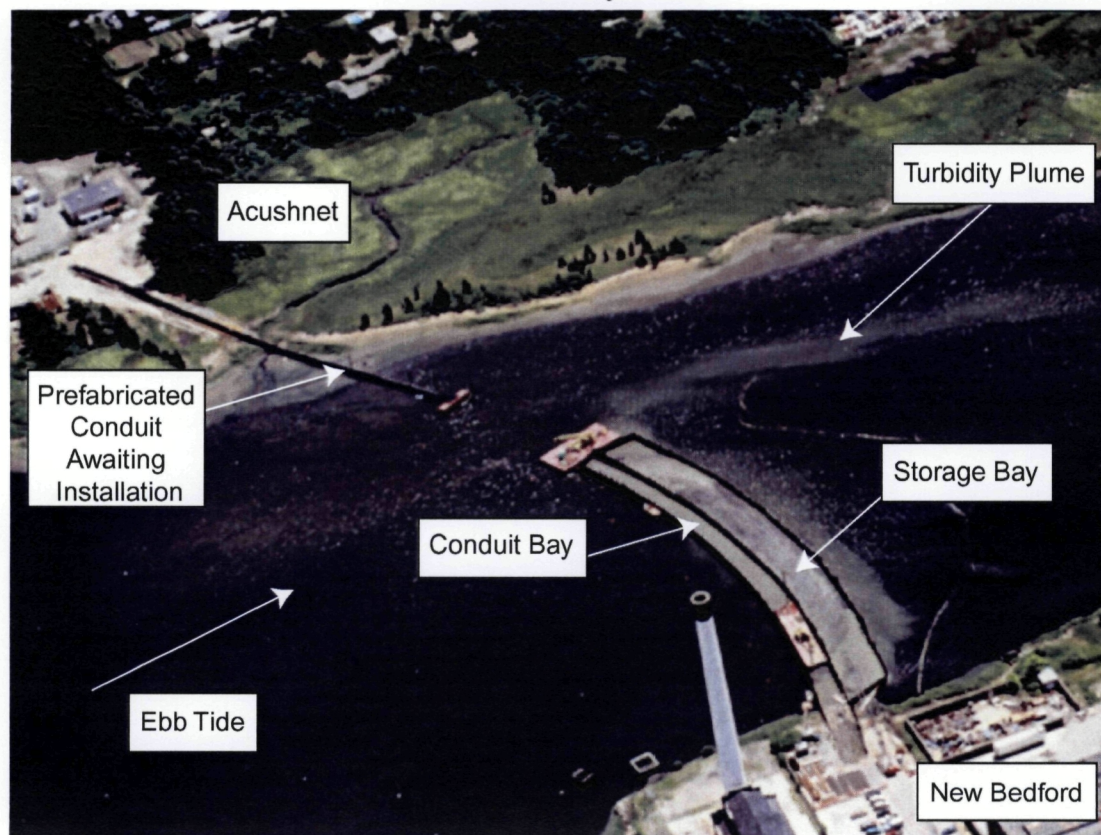


Figure 6. 18 June 2001 - Aerial Photograph of Phase I Construction
with Distinct Turbidity Plume



Source: USACEPhoto

M02143_fig6

Figure 7. Mysid Shrimp (*A. bahia*) 48-Hour Survival
Cumulative Test Results (April 2001 - February 2002)

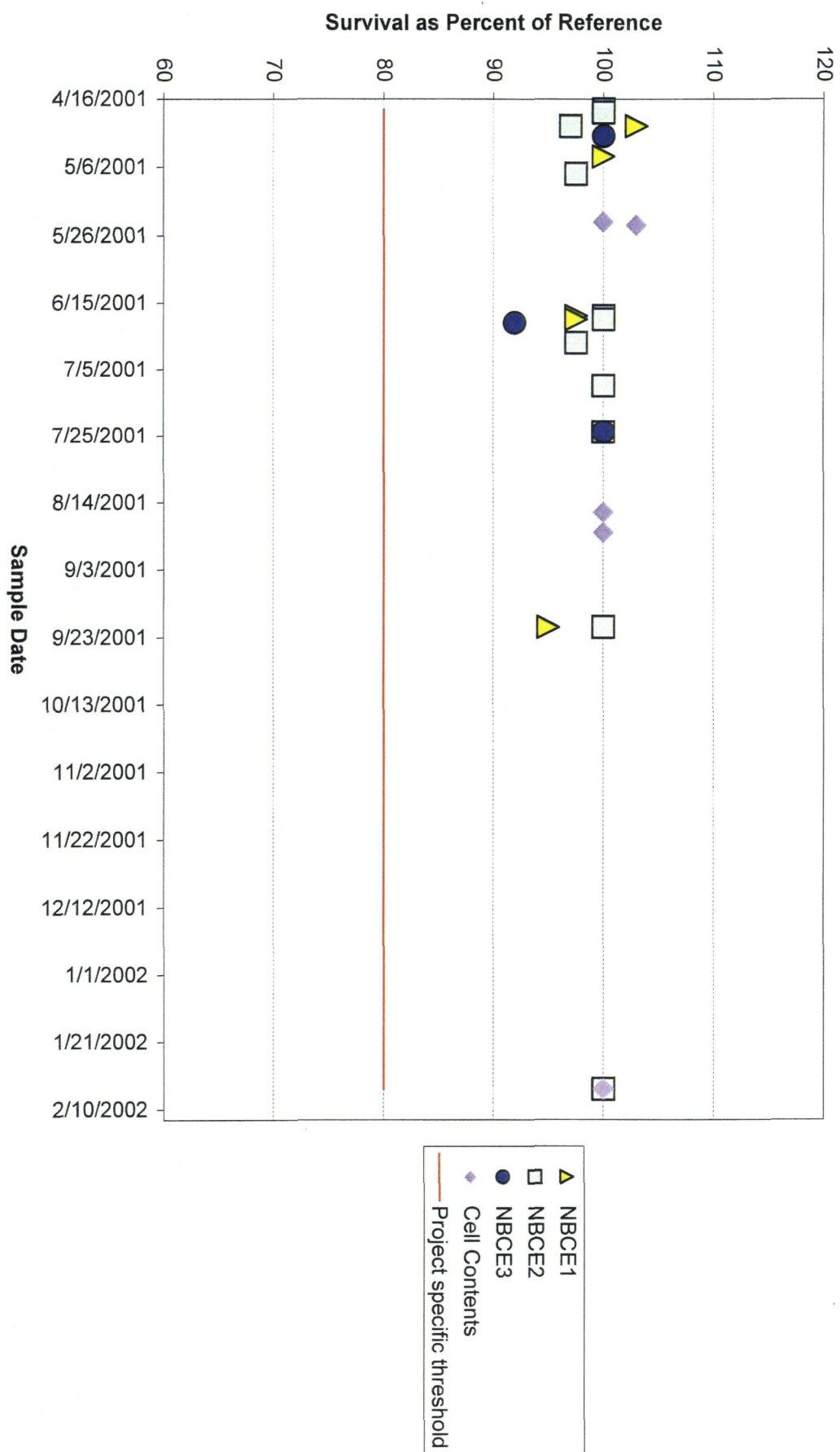
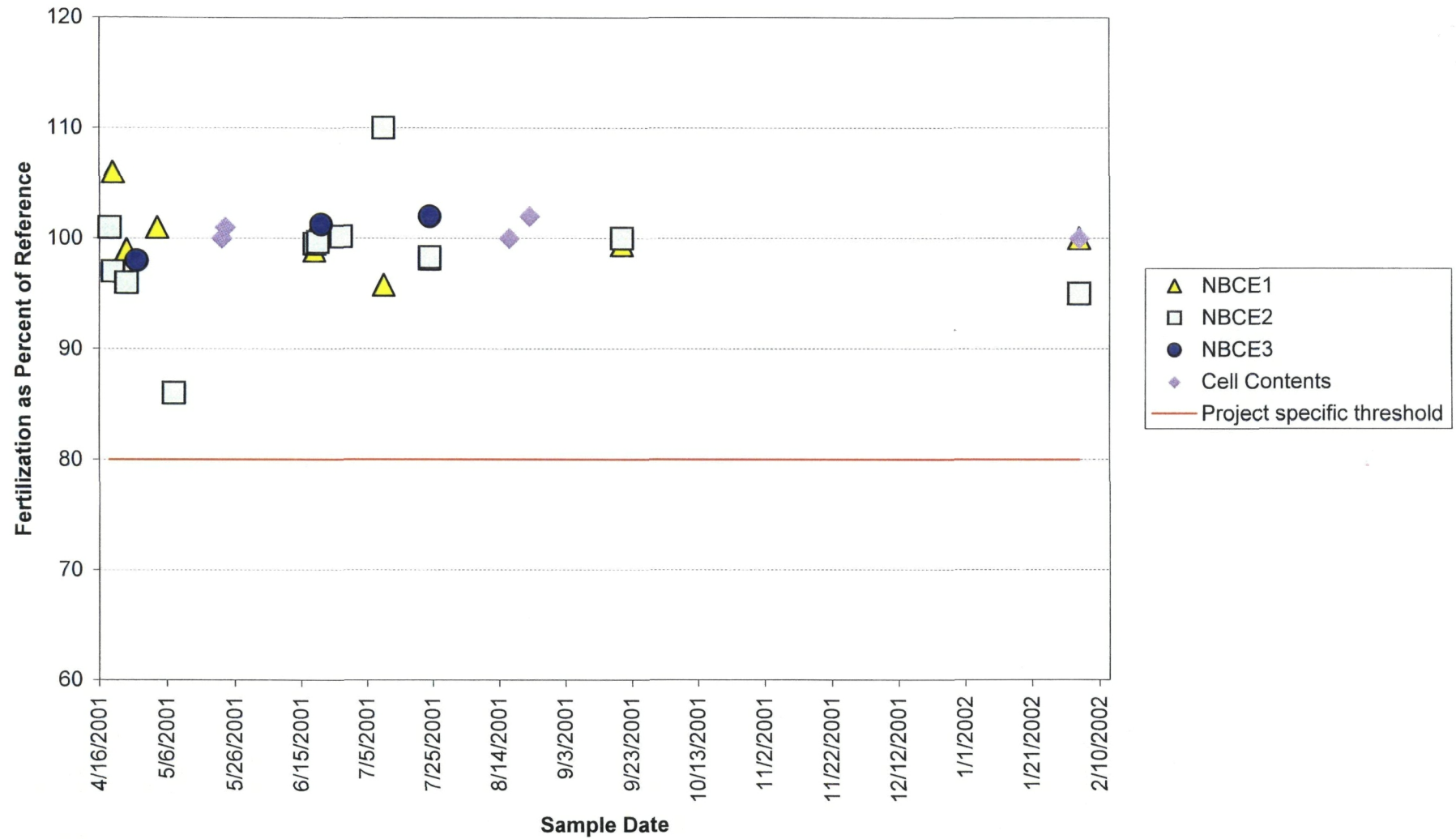
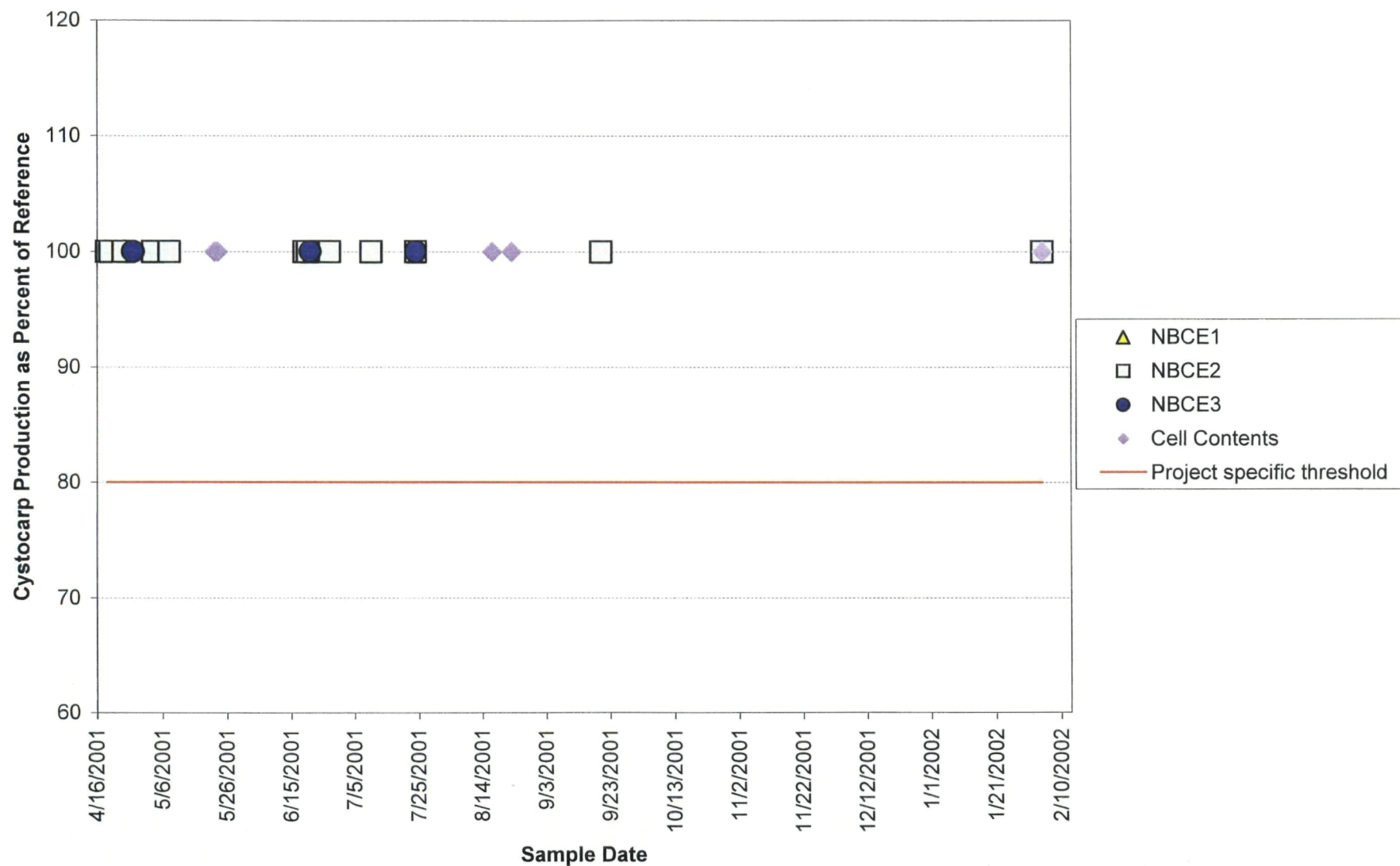


Figure 8. Sea Urchin (*A. punctulata*) Fertilization Bioassay
Cumulative Test Results (April 2001 - February 2002)

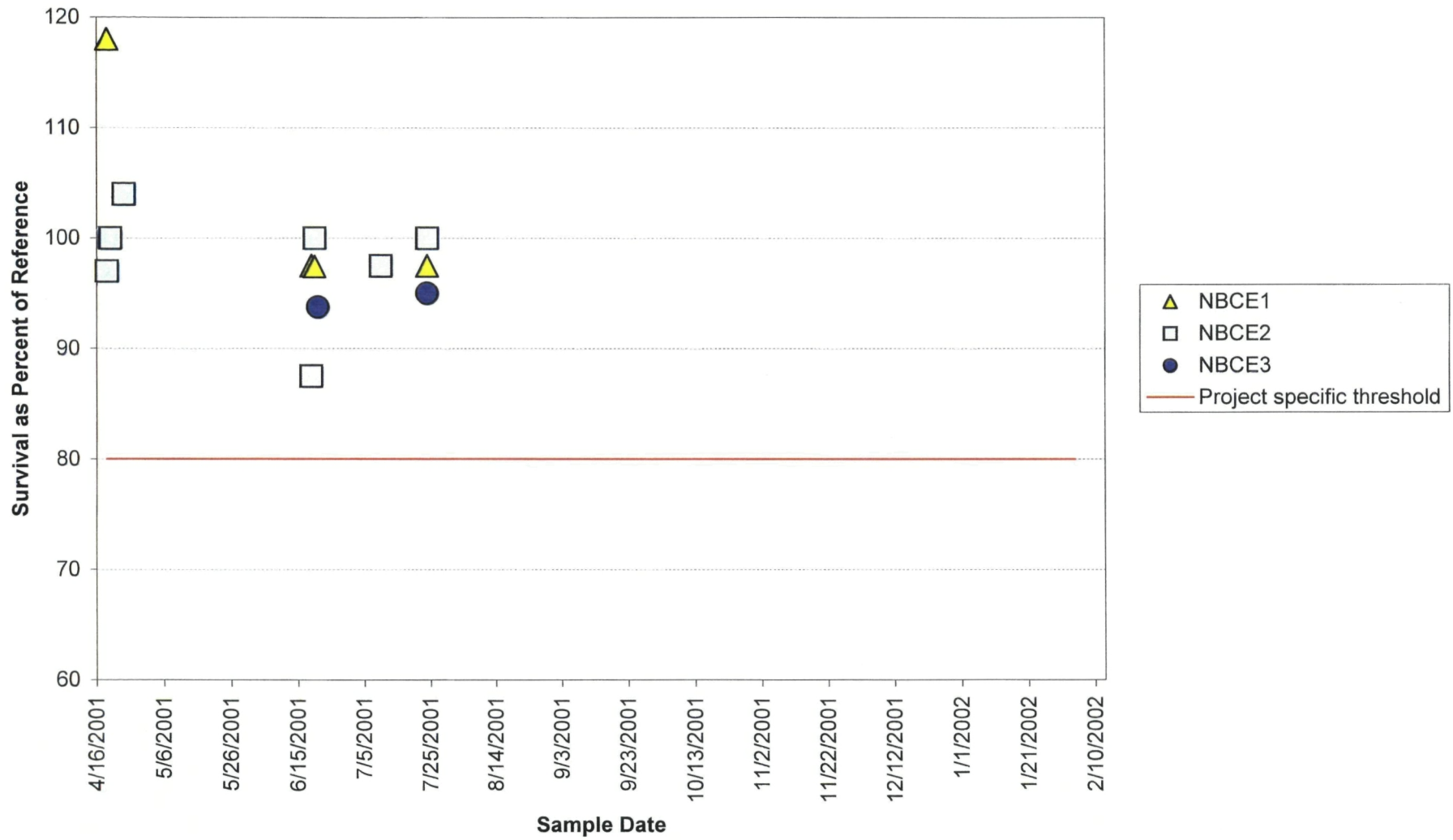


**Figure 9. Red Alga (*C. parvula*) 48-Hour Survival
Cumulative Test Results (April 2001 - February 2002)**



Cystocarp production for samples collected on 4/24/01, 6/19/01, 6/20/01, and 6/21/01 were substantially greater than the associated reference samples (more than 150%) and were not displayed on this chart. See summary sheets for results from each testing event.

**Figure 10. Mysid Shrimp (*A. bahia*) 7-Day Survival
Cumulative Test Results (April 2001 - February 2002)**



**Figure 11. Mysid Shrimp (*A. bahia*) 7-Day Growth
Cumulative Test Results (April 2001 - February 2002)**

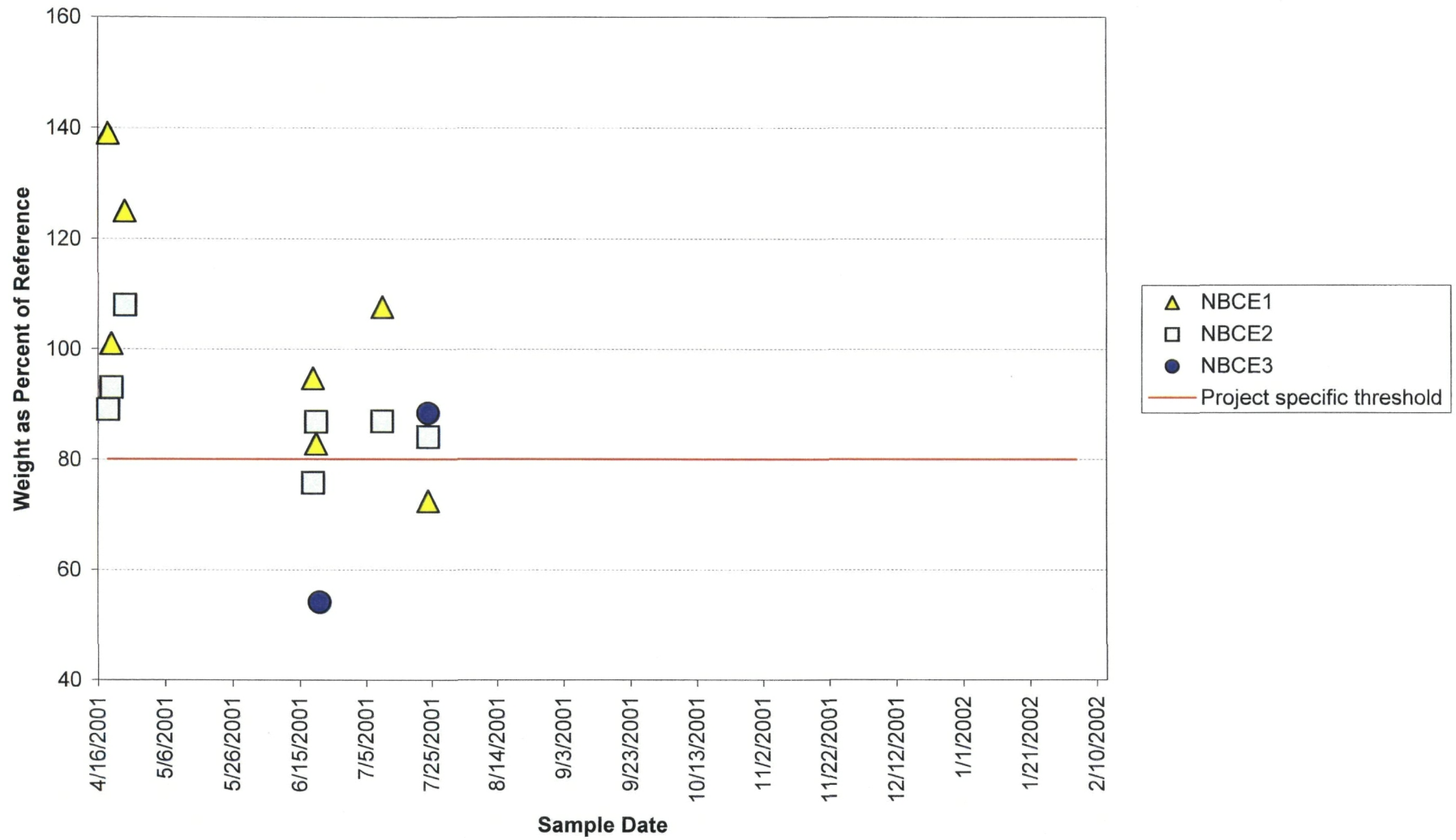
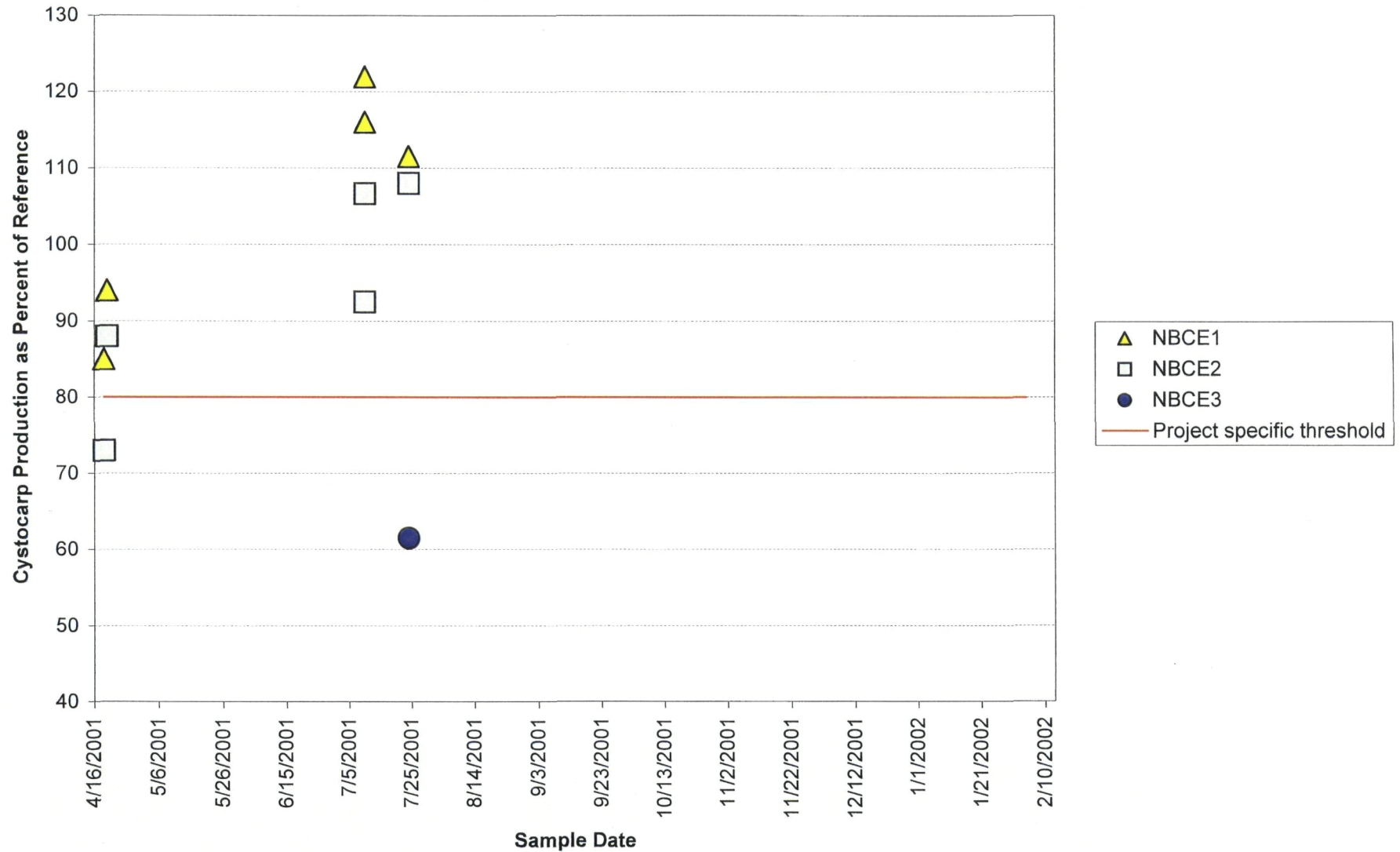


Figure 12. Red Alga (*C. parvula*) 7-Day Cystocarp Production Cumulative Test Results (April 2001 - February 2002)



Cystocarp production for samples collected on 4/24/01, 6/19/01, 6/20/01, and 6/21/01 were substantially greater than the associated reference samples (more than 150%) and were not displayed on this chart. See summary sheets for results from each testing event.

Figure 13. Total Suspended Solids Concentration
Cumulative Results (April 2001 - February 2002)

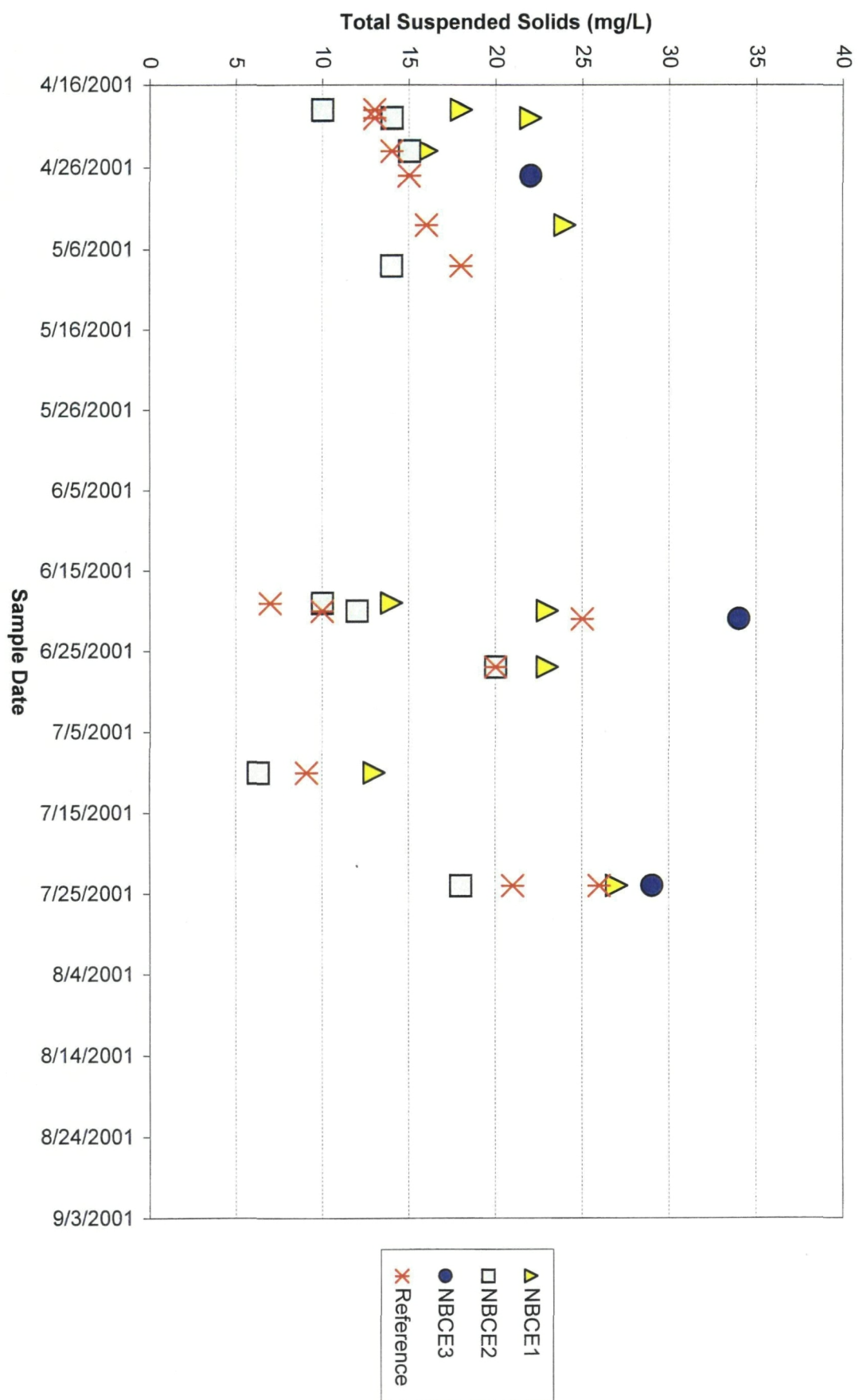
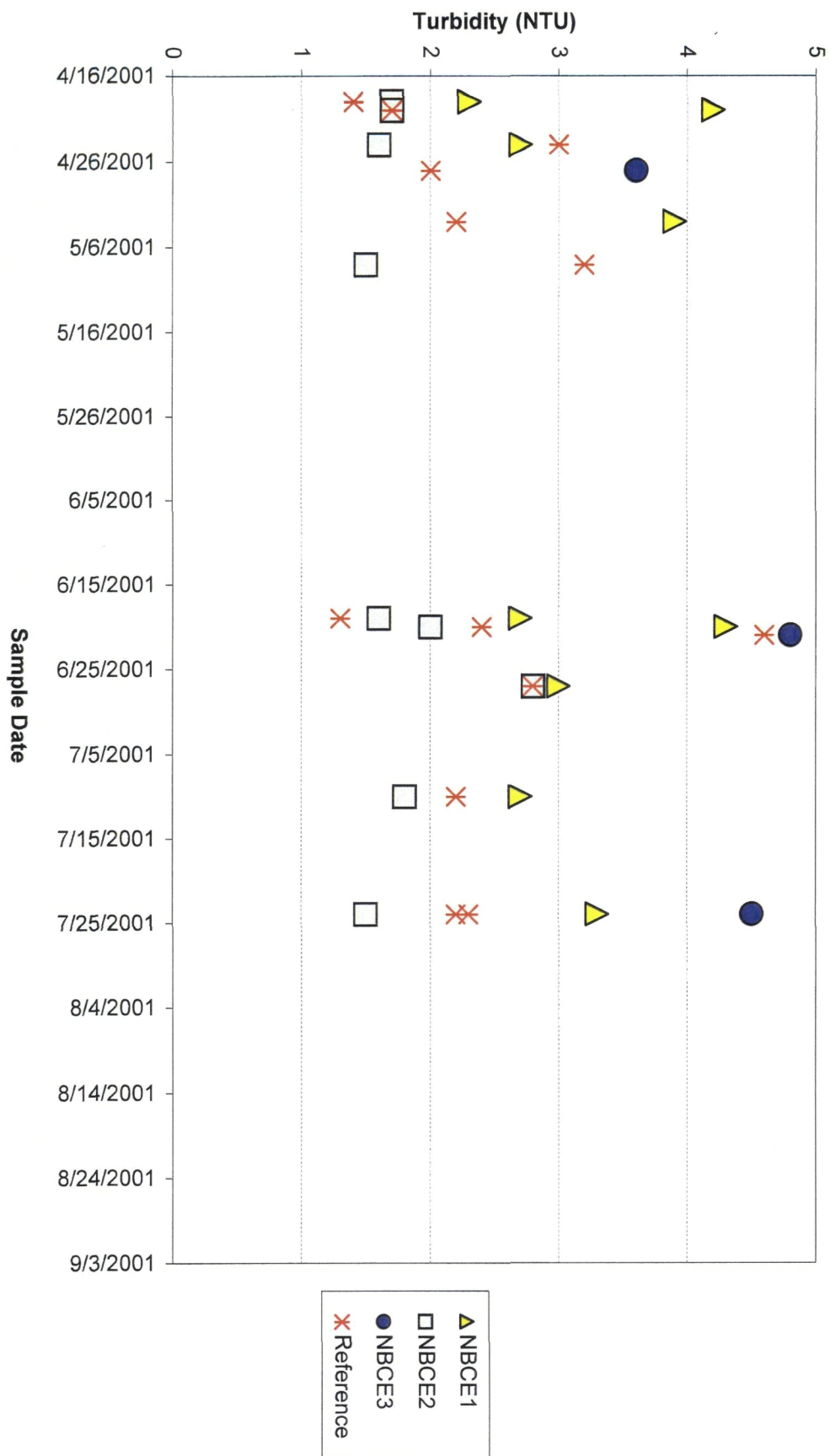
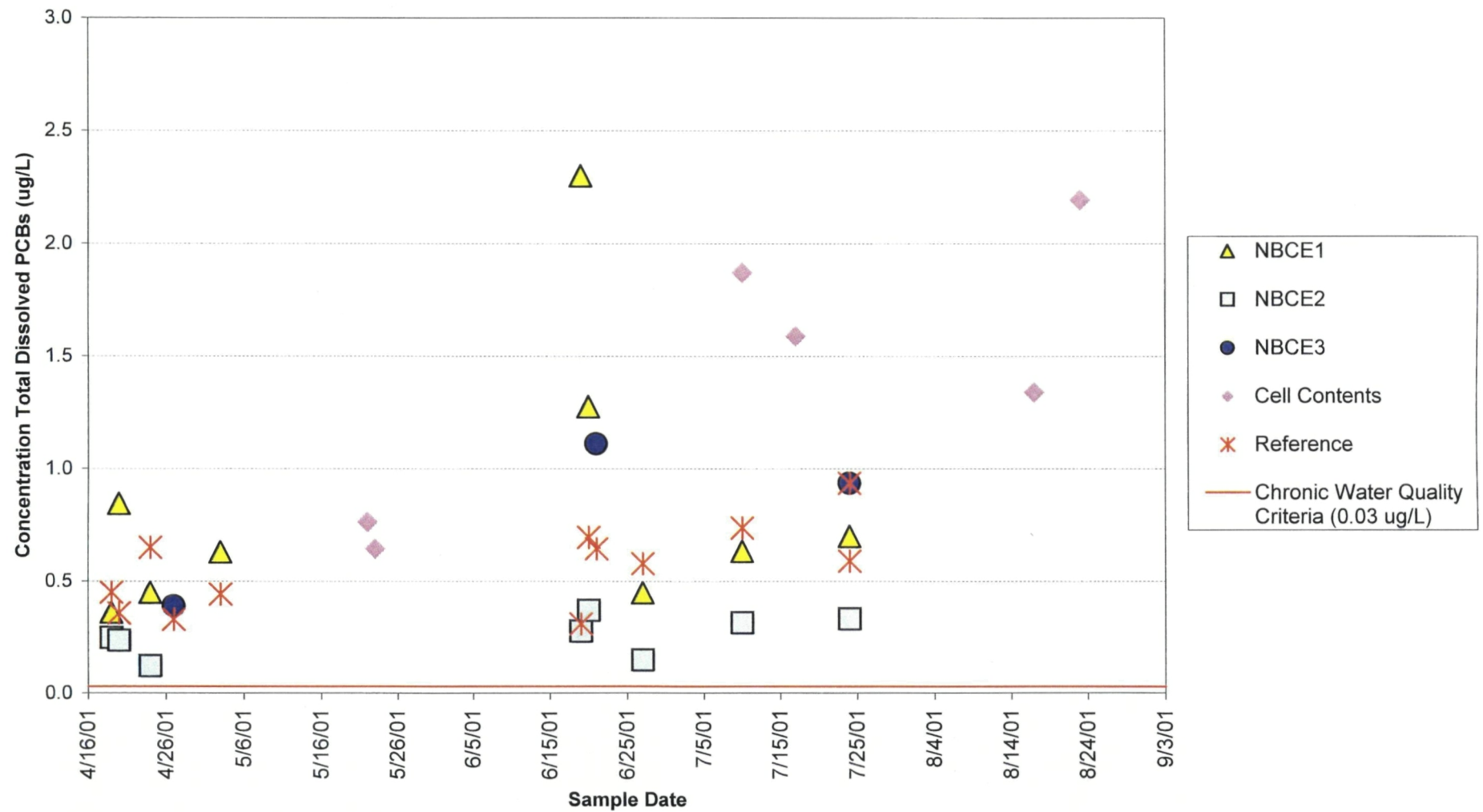


Figure 14. Laboratory Measured Turbidity
Cumulative Results (April 2001 - February 2002)

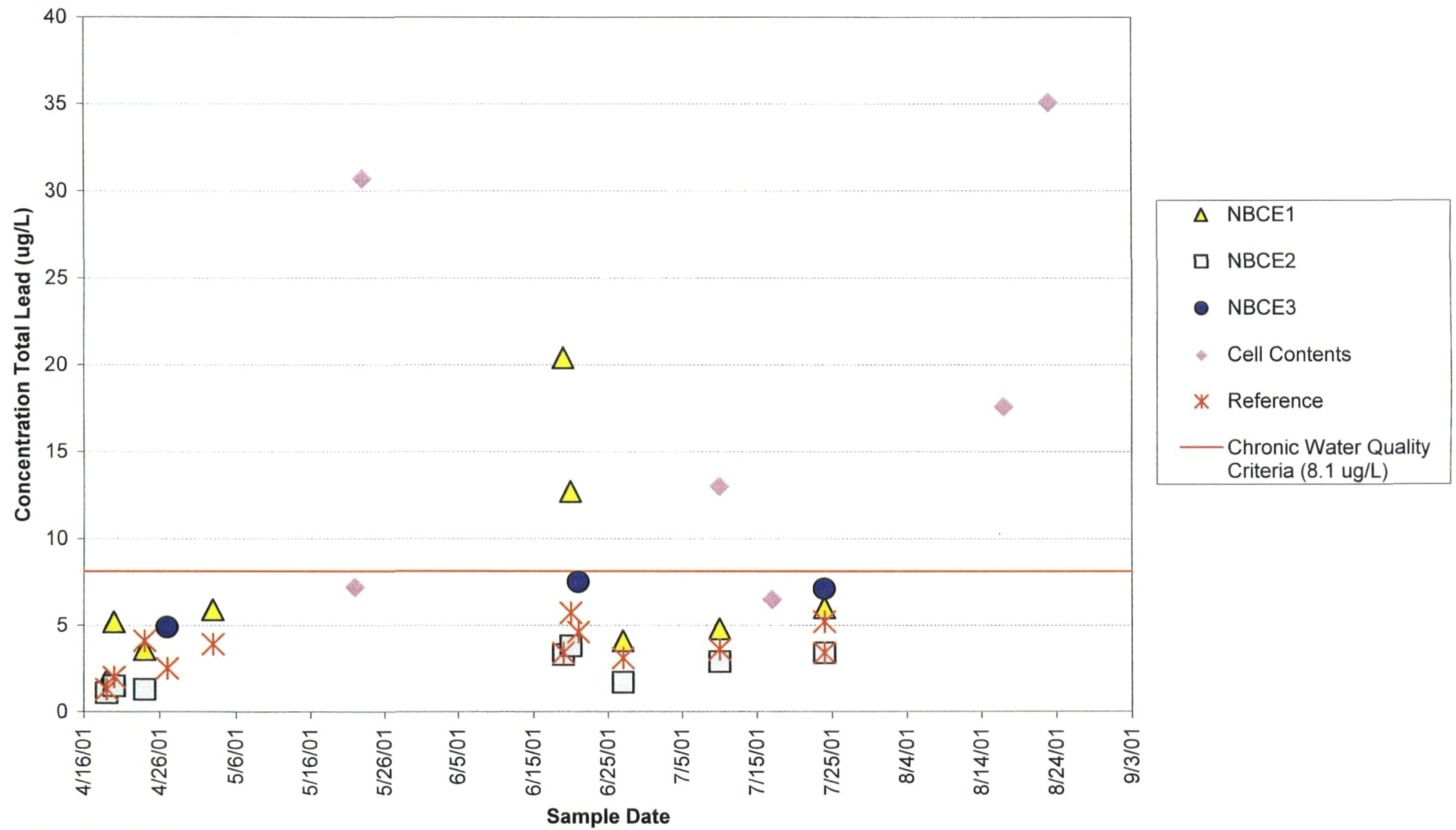


**Figure 15. Total Dissolved PCBs Concentration¹
Cumulative Results (April 2001- February 2002)**

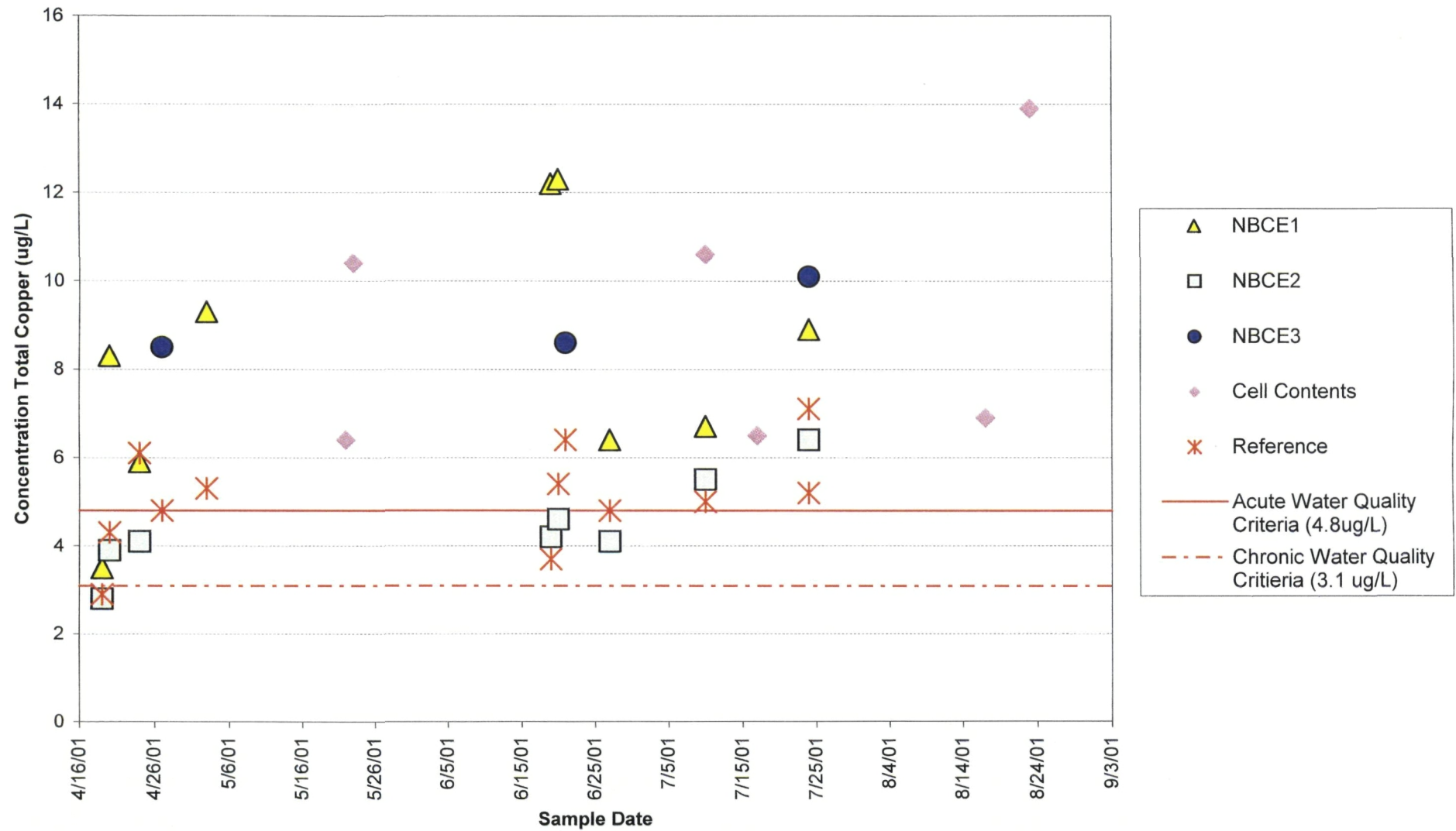
¹ Reported Total Dissolved PCBs represents the sum of the NOAA 18 congeners



**Figure 16. Total Lead Concentration
Cumulative Results (April 2001- February 2002)**



**Figure 17. Total Copper Concentration
Cumulative Results (April 2001- February 2002)**





Appendix A

Scope of Work for Contractor and USACE Water Quality Monitoring

**WATER QUALITY MONITORING
DURING
COM-ELECTRIC POWER LINE INSTALLATION
8 JANUARY 2001**

The following is the water-quality monitoring program to be conducted by ENSR on behalf of the USACE/USEPA for the Com-Electric power-line installation located within the Acushnet River estuary. The work is scheduled for March of 2001. This approach was developed during discussions between the USACE, USEPA (AED) and ENSR on 3 October 2000.

I. Monitoring Approach:

The goal of the monitoring program is to limit the extent of contaminant mobilization and associated environmental impacts to the upper estuary of New Bedford Harbor during project operations. To achieve this goal, a water quality monitoring program has been designed similar to that instituted during the hot spot remediation dredging which took place in the 1994-1995 timeframe. The purpose of this program is to monitor water column impacts and allow managers to limit acute environmental effects to the upper estuary, between the Wood and Coggeshall Street Bridges.

A tiered approach combining water column chemistry and acute toxicity testing will be employed for the duration of the project. The toxicity testing serves as a check on the chemistry and a screen for the presence of toxicity associated with contaminants not measured.

As with the monitoring program instituted during the hot spot removal operation, the intensity of the sampling will be dependent upon the timing of the various construction phases such as sheeting installation and removal, trench excavation and the re-covering of the utility lines. An outline of the main stages is included with this SOW (Attachment 1). The intensity of the monitoring will be greatest upon the initiation of each construction phase (i.e. 3 consecutive days per week-Level 1 effort) that has the greatest potential for increasing suspended sediment loads and their associated contaminants to the water column. Monitoring will be scaled back (1 - 2 consecutive days per week-Level II effort) for the remainder of each construction phase, and subsequent phases, if test data indicate that there are no significant impacts being incurred. The higher level of monitoring will be re-instituted upon the initiation of the next phase of construction determined to have the potential for impact or when some other event is experienced which warrants assessment, such as the presence of a continual sheen or significant increases in turbidity for an extended period.

Monitoring stations will be strategically located either north or south of project operations, depending on the tidal phase, to assess near and far-field effects and to limit the extent of environmental impact. Comparisons to background data will allow for the discrimination between project related and natural elevations in the parameters being measured.

II. Monitoring Plan

Sampling will be conducted on both the ebb and flood tides, as outlined below, at stations downstream of project operations to assess total suspended sediment and contaminant migration.

Background Samples

For each day of monitoring, the Contractor (ENSR) shall collect background water samples upstream and outside the influence of project operations. These samples are to undergo PCB and TSS analysis as well as the required toxicity testing to serve as a basis of comparison for the data collected at the downstream monitoring stations.

Ebb Tide Monitoring

During the ebb tide, there will be two monitoring transects (stations NBCE-1 and NBCE-2)) south of project operations. Based on real time turbidity monitoring, as employed during the pre-design field tests, the Contractor shall collect a series of water samples along a transect downstream and perpendicular to project operations where turbidity levels approach background levels, as determined by the background samples. This transect will be known as the near-field station or NBCE-1. Along this transect during each day of monitoring, individual water samples are to be collected hourly, in a manner which ensures adequate spatial (horizontal and vertical) coverage of the water column in order to yield a representative composite sample for the ebb tide. These individual samples are to be composited to yield one sample of sufficient volume to carry out the required physical, chemical and biological analysis. Physical testing includes turbidity and total suspended solids analysis. Chemical testing includes dissolved PCBs (18 NOAA Status and Trends congeners), total Copper and total Lead. The particulate phase of the PCBs is to be archived for potential future analysis in the event that toxicity criteria are exceeded. A 24-hour turn-around time will be required on the analysis (See Reporting section). The resulting data will be compared to background levels to determine the relative extent of contamination within the water column attributable to project operations.

Biological Testing

In addition to the physical and chemical testing, the Contractor shall also perform acute toxicity testing for each day of monitoring. These tests include the sea urchin (*Arbacia punctulata*) sperm cell test (24-hr), the 7-day mysid (*Mysidopsis bahia*) survival test, and the red alga (*Champia parvula*) survival test (48-hr). Reference samples to be included in the testing are to be collected from the background station location. The action criteria to identify significant impact will be acute effects greater than 20% that of the reference station for any two species, or 50% greater than reference in any one organism.

The second transect location is at the Coggeshall Street Bridge (NBCE-2), which will serve to verify that acute effects are being limited to the upper estuary. It is anticipated that the monitoring station to be used for Superfund remediation activities will have been constructed and will be used for this effort. The Contractor shall take water samples hourly (or at a pre-determined drop in tidal height) over an ebb tide and composited to generate one representative sample to undergo the same physical, chemical and biological analysis as the near-field station. Physical and chemical data collected will be compared to background sampling data and the near-field station to assess relative contamination levels. The same toxicity criteria as applied to the near-field station are applicable to NBCE-2. If significant toxicity, as defined by the action criteria, is detected at both the near-field station (NBCE -1) and at NBCE-2, EPA and the Corps may conclude that there are significant unacceptable impacts occurring as a result of project operations. At this point, a change in construction methodology or the imposition of operational constraints could be warranted.

Flood Tide Monitoring

To the north of project operations during a flood tide, one sampling transect (station NBCE-3) will be located just south and parallel to the Wood Street Bridge. At this location, the Contractor shall collect water samples for each day of monitoring during a flood tide while construction is occurring. Water sample collection, analysis and criteria are identical to that of ebb tide monitoring events. This station would serve to identify potential contaminant migration north of the Wood Street Bridge and to limit any acute toxicity impacts to the upper estuary.

III. Sampling Schedule

Attachment 1 is a schedule of the main construction stages associated with this project. The stages in bold type have been identified to have the greatest potential for water column impact and will require a Level 1 monitoring effort. The unbolded stages represent timeframes for decreased monitoring and require a Level II monitoring effort. However, if conditions warrant, monitoring may be increased to Level I. It is expected that the overall project will take approximately 12 weeks from start to completion. Based on the attached construction schedule (Attachment 1), the Contractor's estimate must include the costs associated with Level I and a Level II monitoring and assume that there will be eight (8) Level I and six (6) Level II events. As part of Contractor's cost estimate for this work, the Contractor shall submit a table outlining the number of samples which will require analysis for this monitoring program as well as the cost per sample.

IV. Com-Electric Oversight

Com-Electric will also be performing project-related turbidity monitoring during the construction phases in compliance with the Government imposed water quality monitoring program (Attachment 2). The Contractor (ENSR) shall provide the necessary

oversight to Com-Electric (or its contractor), which includes an initial coordination meeting and periodic field inspections, to ensure that water quality measurements are being carried out according to monitoring specifications. It will also be necessary that the Contractor (ENSR) establish and maintain sufficient communication with Com-Electric to provide efficient transfer of monitoring data and notification of criteria exceedances.

V. Reporting Requirements

The Contractor shall construct a standardized field data sheet which contains all pertinent information related to field sample collections including current construction phase, weather conditions, discernable plumes or sheens and any other information which could effect the interpretation of results.

The Contractor shall present physical and chemical test results daily, in a continuous electronic spreadsheet format for each day of monitoring showing station data relative to background (reference). Results shall be made available electronically on a 24-hour turnaround basis, with hard-copy data packages due within 3 weeks of delivery. It is emphasized that the Contractor is responsible for insuring that all test data submitted to the Government on a 24-hour turn-around basis has been validated and found acceptable for release. A release signature must accompany the data. Toxicity data shall also be reviewed, validated and made available within 24 hours of test completion. The Contractor shall notify the USACE and EPA immediately upon a determination of significant toxicity in the test organisms.

The Contractor shall prepare a summary report within 1 month of completion of the monitoring program. The report must include an introduction and overview of the monitoring program, data summary tables, and a discussion summarizing results relative to the various construction phases. The Com-Electric turbidity data should also be discussed and included as an Appendix. Four copies of the draft report shall be provided to the Government (USEPA and USACE). The Contractor shall produce a final report (10 copies) within two weeks of receipt of the final set of comments.

VI. Government Point of Contact

Mr. Jay Mackay (978) 318-8142 is the Technical Manager and can be contacted to arrange meetings or answer questions relative to this Task Order.

VII. Invoices

The Contractor shall submit monthly invoices for the progress to date on this Task Order. Invoices shall reference the Contract Number and Task Order number. Invoices shall display the category and its item number, the quantity of units used, the unit price, and the total charge for each category as well as the total invoice amount. The Contractor

shall be responsible for the accuracy of the invoices. Incorrect invoices may be returned for correction.

VIII. Proposals

The proposal submitted by the Contractor in response to this scope of work shall indicate separately the supplies/services cost estimate for each separate task described in the scope including project management.

IX. Quality Control

The Contractor is responsible for quality control. Quality control must be applied throughout the entire report preparation process. Although the Government technically reviews submissions required by this contract, it is emphasized that the Contractor's work must be prosecuted using proper internal controls and review procedures. The letter of transmission for each submission shall include a certification that the submission has been subjected to the Contractor's own review and coordination procedures to ensure: (a) completeness for each discipline commensurate with the level of effort required for that submission, (b) elimination of conflicts, errors, and omissions, and (c) the overall professional and technical accuracy for the submission. Documents, which are significantly deficient in any of these areas, will be returned for correction and/or upgrading at the Contractors expense prior to Government acceptance. Task Order submission dates will not be extended if a responsions of draft material is required for this reason. The Contractor and his associates, if any, shall have the professional competency and technical expertise necessary to accomplish this project in a satisfactory manner.

X. Conferences

During the progress of the work, the Contractor shall confer with the Technical Manager as necessary to assure timely and accurate reporting and approval of all completed work. Additionally, the Contractor will review all invoices with the Technical Manager prior to submittal for payment.

XI. Release of Data

All data, reports, and materials obtained as a result of this contract shall become the property of the U.S. Government and shall be turned over to the Technical Manager upon completion of this contract.

XII. Report Revisions and Corrections

Results of all reviews by the Government will be furnished to the Contractor in the form of written comments and marked-up material. The Contractor shall incorporate the written comments into the report or item within thirty days or as specified in the Scope of Work for the Task Order. Any comments due to errors or inconsistencies in the

report on the part of the Contractor shall be made by the Contractor at his own expense. If changes in criteria and/or additions are, in the view of the Government, required beyond the original scope of work and services, the Contractor shall be notified in writing by the Technical Manager and adjustment in the fee will be made to cover the additional work required. Any such additional work executed by the Contractor without the appropriate written notice is undertaken at his own risk.



ATTACHMENT 2

COM-ELECTRIC POWER LINE RELOCATION

MAIN CONSTRUCTION STAGES

Phase I New Bedford Side (Approximately 6 weeks)

1. **Install sheeting half-way across the estuary***
2. **Excavate trench**
3. Install leveling course (gravel base)
4. Float conduit yoke system into place and anchor
5. Place concrete cap
6. **Remove center sheet-pile and smooth out excavated sediment pile within the containment**
7. **Remove outside sheets (North & South) leaving approximately 50' in place in the middle with conduit ends over-hanging**

Phase II – Acushnet Side (Approximately 6 weeks)

1. **Install sheeting for other half of estuary**
2. **Excavate trench**
3. Install leveling course (gravel base)
4. Float conduit and yoke system into place, attach center ends together, then anchor starting from the center and working towards shore
5. Place concrete cap
6. **Remove center sheet-pile and smooth out excavated sediment pile within the containment**
7. **Remove outside sheets (North & South)**

**Bold type indicate a Stage 1 monitoring event

COMMONWEALTH ELECTRIC COMPANY

WATER QUALITY MONITORING DURING CONSTRUCTION

16 OCTOBER 2000

General

The sediments within the upper portions of the New Bedford Harbor estuary and wetland areas contain extremely high levels of PCBs, which can have significant environmental impacts if released to the water column in an uncontrolled manner. For this reason, the Contractor will be required to perform water quality monitoring during all phases of construction and installation activities occurring below mean high water within the Acushnet River estuary. This has been the case for all intrusive activities associated with Superfund remediation actions.

The overall construction activity will impact water quality to some degree in the vicinity of the operation. The level of impact will be dependent on the particular phase of the operation such as sheeting installation and removal, trench excavation and covering and support vessel activity. The latter activity is of particular concern given the experience gained through the recently completed pre-design field-testing. For this reason, the Contractor will be required to perform water quality monitoring at varying levels of intensity depending on the phase of the operation. The overall goal of the Contractor based monitoring is to ensure that the construction operation is carried out in a manner such that significant transport of sediments and their associated contaminants outside the construction zone does not occur. The construction zone includes any location where activity related to the project is taking place such as the cable crossing area, support docking locations, transit corridors for vessels etc.

Monitoring Plan

The Contractor shall perform turbidity monitoring using a backscatter nephelometer with an underwater sensor and direct surface readout. Monitoring includes turbidity measurements along an east-west oriented transect(s) at the downcurrent edge of the "Mixing Zone". The term "Mixing Zone" is defined based on location of the construction activity as follows:

(1) For construction operations which occur within an area between an extension of Hadley Street to the north and Coffin Street to the south (includes the cable corridor) (See Attachment 1), the mixing zone includes an area **300 feet downstream** of these activities. Therefore, turbidity transects are to be run 300 feet south (during an ebb tide) and 300 feet north (during a flood tide flood tide) of construction related activities falling within this area.

(2) For construction activities which take place north of an extension of Hadley Street, the mixing zone is 200 feet to the north on a flood tide and 500 feet south on an

ebb tide. For construction activities, which take place south of the Coffin Street extension, the mixing zone includes an area 200 feet south on an ebb tide and 500 feet north on a flood tide. Therefore, turbidity transects are to be run on the downstream edge of these areas on both an ebb and flood tide.

The Contractor should plan on monitoring on a daily basis during the course of construction. However, monitoring may be cut back during a particular phase of construction when it has been found that there has been minimal impacts to the water column for that activity. Turbidity shall be measured at approximately 20-foot intervals at mid-depth along the downcurrent transect when water column depths are ten feet or less. When water depths are greater than 10 feet, additional vertical profiles shall be made 3 feet below the surface and 3 feet above the bottom to detect sub-surface plume migration. Transect measurements shall be made on 30 minute cycles during intensive activities such as barge positioning, placement and removal of sheet pile and trench excavation/coverage. During non-intensive phases, transects shall be run at 2-hour intervals. The term downcurrent is defined based on an ebb/flood tide as determined from standard tide tables for New Bedford with confirmation of tidal direction using a local staff gauge and observation of general conditions.

In addition to the turbidity measurements, 3 water samples shall be collected each day for total suspended solids analysis at locations where turbidity measurements were recorded. Areas of elevated turbidity should be targeted. A laboratory turn-around time of 1 week is required.

Criteria

Background measurements of turbidity shall be taken at the start of each monitoring day and at 3-hour intervals, 1000 feet upstream of construction operations. These readings will form the basis of comparison for the monitoring data collected for that day.

The upper level criteria defined, as a "reportable event" will be 50 Nephelometric Turbidity Units (NTUs) above background.

Criteria Exceedences

When the upper level criteria has been exceeded, construction activities shall be temporarily halted until turbidity levels decrease to an acceptable level. During this time, the Contractor shall notify the USACE resident engineer or his representative and attempt to identify and rectify the cause of the exceedence. The monitoring should then resume at the start of construction at an increased level intensity (every 15 minutes over a 60 minute period) to verify that conditions have abated. Explanatory details shall be made on the accompanying data sheet documenting the exceedence and any corrective measures taken. The Contractor shall note the presence and extent of any visible sheens which may emanate from the area of activity even though criteria limits have not been

exceeded. The approximate area of sheen coverage should be sketched onto the data sheet as provided under item 2 above.

Reporting

The Contractor shall develop a data reporting sheet to be approved and submitted to the Government or their representative which records the following information for each transect run:

- (1) Date, time location and type of construction activity as well as the names of sampling team members and team leader.
- (2) A sketch of the construction site which allows for the recording of visual events such as plumes, sheens etc. relative to the transect run which could assist in data interpretation.
- (3) Table or graphic of turbidity values across the transect with beginning and ending times and depth of sensor.
- (4) Notes on weather, tide and other relevant activities.
- (5) A flagging system (i.e. box at the top of the page) which indicates if any criteria were exceeded on that particular day.
- (6) A comment section where field personnel may record any visual observations which may assist in data interpretation.

Data sheets shall be delivered to four locations at the end of each day of monitoring. A hard copy shall be hand delivered to the Corps resident engineer on-site office. Faxed copies of the data sheets shall be sent to individuals to be identified at EPA Region I, EPA Narragansett and the Corps Engineering/Planning office in Concord, Massachusetts.

It should be noted that the Government will also be performing additional monitoring during construction to assess impacts. If it is determined that unacceptable environmental impact are occurring irrespective of the Contractor's monitoring results, the Government reserves the right to make adjustments to the construction operation to alleviate those impacts. The Government will also periodically perform unannounced quality assurance (QA) checks during Contractor monitoring efforts to ensure data integrity.



Appendix B

Project Photographs



Figure B-1 Construction of Phase I Sheet Pile Cofferdam



Figure B-2 Completed Phase I Cofferdam Defining the Conduit Bay (Left) and Excavated Material Receiving Bay (Right)



Figure B-3 Completed Phase I Cofferdam Extending Approximately Halfway Across the Upper Harbor



Figure B-4 Limited Excavation Outside of the Phase I Cofferdam



Figure B-5 Conduit Bundle Being Moved Into the Phase I Conduit Bay of the Cofferdam



Figure B-6 Shore-Side (New Bedford) Terminus of Phase I Conduit



Appendix C

Daily Log of Construction and Monitoring Activities

**Daily Activity Summary - Construction of the Commonwealth Electric Cable Crossing
New Bedford Harbor Superfund Site**

Date		Construction Activity	Construction sequence	Contractor Monitoring			USACE Monitoring			Notes:
				TSS (mg/L)	Observed Turbidity (NTU)	Observed D.O. (mg/L)	Independent Oversight	Observed Turbidity (NTU)	Sampling Level	
28-Mar-01	Wed	Shore-side construction	Phase 1			NA				ENSR monitoring mobilized
29-Mar-01	Thur	Shore-side construction	Phase 1			NA				
02-Apr-01	Mon	Shore-side construction	Phase 1		<3			3 - 6		ENSR confirmed comparability of Contractor and ENSR field meters. DO 97% sat 11.0mg/l, salinity 11ppt, temp 5 deg.C
03-Apr-01	Tue	Shore-side construction	Phase 1							
04-Apr-01	Wed	Shore-side construction	Phase 1		<3		Yes			
05-Apr-01	Thur	Upland sheet pile driving Flexi-float positioning	Phase 1	11 - 19						ENSR on-site
06-Apr-01	Fri	Excavating rip-rap	Phase 1	2.7 - 69	1 - 8	9.7-11.3				Construction activities limited to the banks of the estuary
09-Apr-01	Mon	Upland sheet pile driving Flexi-float positioning	Phase 1	13 - 17	<5	9.1-10.6	Yes			Higher turbidity observed from prop-wash during barge relocation
10-Apr-01	Tue	Flexi-float positioning Land grading	Phase 1	8.8 - 19	<1	9.5-10.5				
11-Apr-01	Wed	No Construction	Phase 1	12 - 18	<2	9.6-10.6				
12-Apr-01	Thur	Flexi-float positioning	Phase 1	16 - 17	<3	6.9-10.6				
13-Apr-01	Fri	Flexi-float positioning	Phase 1	4.4 - 14	<4	7.8-9.7	Yes			Flexifloat barges were moved up estuary. Substantial surficial freshwater lens (5 - 6ppt) noted above the 2' depth in the estuary, salinity returning to ~30ppt near the bottom.
16-Apr-01	Mon	No Construction Patriot's Day								
17-Apr-01	Tue	Sheet pile driving Loading materials barge	Phase 1	8.1 - 15	<2	8.4-9.9	Yes			Sheet pile driving within 3-feet of shore
18-Apr-01	Wed	Sheet pile driving	Phase 1	10 - 15	<4	8.5-9.7				
19-Apr-01	Thur	Sheet pile driving Barge positioning	Phase 1	3 - 16.7	<5	8.1-9.8		1 - 10	1	ENSR collects a 3-hour composite sample at 300-ft mixing zone. Higher turbidity values (~30NTU) noted about 100 ft downcurrent of construction activities
20-Apr-01	Fri	Sheet pile driving Barge positioning	Phase 1	3.8 - 31.1	1 - 9	8.6-10.2		2 - 100	1	ENSR collects a 3-hour composite sample at the 300-ft mixing zone. Elevated turbidity (20NTU) associated with repositioning barges at low tide was observed.
23-Apr-01	Mon	Sheet pile driving Barge positioning	Phase 1		<4	7.1-9.3				
24-Apr-01	Tue	Sheet pile driving	Phase 1	9 - 33	1 - 9	8.3-9.2		5 - 15	1	ENSR collects a 3-hour composite sample at 300-ft mixing zone. Bottom turbidity values of 60 - 70NTU were observed in the immediate vicinity of sheet pile driving.
25-Apr-01	Wed	Sheet pile driving Barge loading/positioning	Phase 1	18 - 22	4 - 32	7.4-8.7		4 - 30	1	ENSR postpones sampling event because sheet pile driving was being conducted above the high water mark.
26-Apr-01	Thur	Sheet pile driving Barge positioning	Phase 1	14 - 18	<3	7.5-9.1				
27-Apr-01	Fri	Sheet pile driving Barge positioning	Phase 1		<4	8.6-9.5		4 - 11	1	ENSR conducts a modified Level 1 sampling event - without chronic toxicity.
30-Apr-01	Mon	Sheet pile driving Barge positioning	Phase 1		<3	6.3-8.5				
01-May-01	Tue	Sheet pile extraction/driving Barge positioning	Phase 1		<3	6.9-8.9	Yes			
02-May-01	Wed	Sheet pile driving Barge positioning	Phase 1		<3	7.0-9.5				

**Daily Activity Summary - Construction of the Commonwealth Electric Cable Crossing
New Bedford Harbor Superfund Site**

Date		Construction Activity	Construction sequence	Contractor Monitoring			USACE Monitoring			Notes:
				TSS (mg/L)	Observed Turbidity (NTU)	Observed D.O. (mg/L)	Independent Oversight	Observed Turbidity (NTU)	Sampling Level	
03-May-01	Thur	Sheet pile driving Barge positioning	Phase 1		<3	7.8-10.2		5 - 10	1	ENSR conducts a modified Level 1 sampling event - without chronic toxicity.
04-May-01	Fri	Sheet pile driving Barge positioning	Phase 1		<5	6.8-9.3		4 - 10	1	ENSR mobilizes for a modified Level 1 sampling event - without chronic toxicity. Sampling was abandoned because construction activity shifts to dedicated loading of sheet pile on the materials barge. ENSR noted salinity 24 - 33ppt, temp 15 - 20 degC and D.O from 95-100% saturation.
07-May-01	Mon	Sheet pile driving Barge positioning	Phase 1			7.9 - 9.3				
08-May-01	Tue	Sheet pile driving Barge positioning	Phase 1		<3	6.7 - 8.7		3 - 6	4	ENSR confirmed the comparability of Contractor and ENSR field meters.
09-May-01	Wed	Sheet pile driving Barge positioning	Phase 1	22 - 16	<4	6.7 - 8.7				
10-May-01	Thur	Sheet pile driving Barge positioning	Phase 1	16 - 22	<4	6.2 - 8.6				
11-May-01	Fri	Sheet pile driving Barge positioning South cofferdam completed	Phase 1	17 - 23	<4	6.7 - 9.4	Yes			
07-May-01	Mon	Sheet pile driving Barge positioning	Phase 1			7.9 - 9.3				
15-May-01	Tue	Sheet pile driving Securing south cofferdam	Phase 1		2 - 8	6.7 - 8.4				
16-May-01	Wed	Barge positioning Staging excavation equipment	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
17-May-01	Thur	Barge positioning Staging excavation equipment	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
18-May-01	Fri	Barge positioning Staging excavation equipment	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
21-May-01	Mon	Trench excavation Barge positioning	Phase 1		6 - 24	7.4 - 11.1				
22-May-01	Tue	No Construction	Phase 1						1	South sheet pile wall observed listing inward. Construction activities suspended. ENSR collected a grab sample at point where the wall was breached. The sample was analyzed per Level 1 guidelines.
23-May-01	Wed	No Construction	Phase 1						1	No Contractor monitoring - Construction activities suspended until south sheet pile wall is stabilized. ENSR collected an ebb-tide composite sample at the point where the cofferdam was breached; sample analyzed per Level 1 guidelines.
24-May-01	Thur	No Construction	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
25-May-01	Fri	Sheet pile stabilization Barge positioning	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
28-May-01	Mon	No Construction Memorial Day	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
29-May-01	Tue	Sheet pile stabilization Driving soldier piles/sheet pile	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
30-May-01	Wed	Sheet pile stabilization Driving soldier piles/sheet pile	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
31-May-01	Thur	Sheet pile stabilization Driving soldier piles/sheet pile	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
01-Jun-01	Fri	Sheet pile stabilization Driving soldier piles/sheet pile	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
04-Jun-01	Mon	Sheet pile stabilization Driving soldier piles/sheet pile	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact

**Daily Activity Summary - Construction of the Commonwealth Electric Cable Crossing
New Bedford Harbor Superfund Site**

Date		Construction Activity	Construction sequence	Contractor Monitoring			USACE Monitoring			Notes:
				TSS (mg/L)	Observed Turbidity (NTU)	Observed D.O. (mg/L)	Independent Oversight	Observed Turbidity (NTU)	Sampling Level	
05-Jun-01	Tue	Sheet pile stabilization Driving soldier piles/sheet pile	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
06-Jun-01	Wed	Sheet pile stabilization Driving soldier piles/sheet pile	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
07-Jun-01	Thur	Sheet pile stabilization Driving soldier piles/sheet pile	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
08-Jun-01	Fri	Sheet pile stabilization Driving soldier piles/sheet pile	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
11-Jun-01	Mon	Sheet pile stabilization Driving soldier piles/sheet pile	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
12-Jun-01	Tue	Sheet pile stabilization Driving soldier piles/sheet pile	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
13-Jun-01	Wed	Sheet pile stabilization Driving soldier piles/sheet pile	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
14-Jun-01	Thur	Sheet pile stabilization Driving soldier piles/sheet pile	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
15-Jun-01	Fri	Sheet pile stabilization Driving soldier piles/sheet pile	Phase 1							No Contractor or ENSR monitoring - construction activities low/no impact
18-Jun-01	Mon	Trench excavation	Phase 1		8 - 60 see notes	5.7 - 10.1	Yes			Turbidity exceedence (60 NTU) observed in proximity of a leak discovered in the cofferdam. Situation controlled by placing silt boom around affected area of cofferdam; turbidity values fall back to 8 - 20NTU.
9-Jun-01	Tue	Trench excavation	Phase 1		2 - 21	2.7 - 7.4		4 - 20	1	Turbidity plume still visible from cofferdam leak discovered 18 June, but well below action level. Low DO values determined to be caused by a damaged DO membrane.
20-Jun-01	Wed	Trench excavation	Phase 1		2 - 14	4.0 - 8.2			1	Turbidity plume at the point of cofferdam leak no longer detectable.
21-Jun-01	Thur	Trench excavation	Phase 1		3 - 14	3.0 - 6.2		8 - 21	1	Low DO values determined to be caused by damaged DO membrane.
22-Jun-01	Fri									No Contractor monitoring
23-Jun-01	Sat	Driving temporary piles to secure conduit bundle (Acushnet side)	Phase 1		6 - 8	4.7 - 7.5				
25-Jun-01	Mon	Upland excavation (New Bedford) Conduit bundle floated out onto estuary and secured	Phase 1		2 - 8	4.9 - 7.0	Yes			Contractor DO meter repaired and functioning properly.
26-Jun-01	Tue	Trench excavation Equipment repairs	Phase 1						4	ENSR mobilizes for a modified Level 4 sampling event. Sampling was abandoned because of discontinued construction activities.
27-Jun-01	Wed	Trench excavation	Phase 1		5 - 18	7.9 - 12.7		<10	4	ENSR conducts a modified Level 4 sampling event - Samples collected at NBCE1 for chemistry (no tox) with a requested 24-hour turnaround. NBCE2 and EREF were analyzed on a 7-day turnaround.
28-Jun-01	Thur	Trench excavation	Phase 1							
29-Jun-01	Fri	Trench excavation	Phase 1		5 - 18	6.3 - 11.6				
30-Jun-01	Sat	Trench excavation	Phase 1		5 - 18	6.3 - 11.8				
02-Jul-01	Mon	Trench excavation	Phase 1	9.6 - 27	9 - 25	4.9 - 8.5				
03-Jul-01	Tue	Trench excavation	Phase 1	19 - 26			Yes			Checked the comparability between Contractor and ENSR DO measurements - ENSR meter recording values 0.4-1.1 mg/L higher.

**Daily Activity Summary - Construction of the Commonwealth Electric Cable Crossing
New Bedford Harbor Superfund Site**

Date		Construction Activity	Construction sequence	Contractor Monitoring			USACE Monitoring			Notes:
				TSS (mg/L)	Observed Turbidity (NTU)	Observed D.O. (mg/L)	Independent Oversight	Observed Turbidity (NTU)	Sampling Level	
04-Jul-01	Wed	No Construction Independence Day	Phase 1							No Construction
05-Jul-01	Thur	Trench excavation	Phase 1	8.8 - 36	0 - 21	4.6 - 8.8				
06-Jul-01	Fri	Trench excavation	Phase 1	5 - 9	4 - 15	5.8 - 9.8				
07-Jul-01	Sat	Trench excavation	Phase 1		1 - 8	7.0 - 8.5				
09-Jul-01	Mon	Trench excavation	Phase 1	6.6 - 18	2 - 18	5.5 - 9.1				
10-Jul-01	Tue	Trench excavation	Phase 1	4 - 19	3 - 13	6.5 - 12.0		2 - 12	1	A second breach in the cofferdam was detected at the west end. ENSR collected a sample of cell contents.
11-Jul-01	Wed	Trench excavation	Phase 1	16 - 26	3 - 12	7.0 - 9.3	Yes			
12-Jul-01	Thur	Trench excavation	Phase 1		7 - 18	6.1 - 13.8				
13-Jul-01	Fri	Trench excavation Laying stone bedding	Phase 1		7 - 22	3.0 - 14.4				
14-Jul-01	Sat	Laying stone bedding	Phase 1		4 - 12	4.8 - 8.5				
16-Jul-01	Mon	Laying stone bedding	Phase 1		5 - 25	5.4 - 10.4	Yes			
17-Jul-01	Tue	Laying stone bedding	Phase 1		4 - 14	5.1 - 7.7		2 - 8		Collected a grab sample for chemistry and turbidity/TSS from inside the silt curtain protecting the breach at the west end of the cofferdam. No other samples collected. DO values taken by ENSR ranged from 3.4 mg/L or 51.3% to 4.5mg/L or 57.5% saturated.
18-Jul-01	Wed	Laying stone bedding Grading bed	Phase 1		3 - 21	2.8 - 8.5				
19-Jul-01	Thur	Grading bed	Phase 1		4 - 16	4.4 - 8.1				
20-Jul-01	Fri	Laying stone bedding Surveying	Phase 1		5 - 18	4.7 - 10.5				
23-Jul-01	Mon	Grading bed Barge positioning	Phase 1		6 - 34	5.5 - 12.3				ENSR was on-site to conduct a monitoring effort but Contractor did not perform planned excavation work outside the cofferdam - effort was abandoned. Higher turbidity numbers observed were related to repositioning barges at low tide.
24-Jul-01	Tue	Excavation outside cofferdam Sheet pile extraction (end wall) Positioning conduit into cofferdam	Phase 1		5 - 27	5.0 - 7.1		0 - 51	1	ENSR conducts two Level 1 sampling events, ebb tide and flood tide.
25-Jul-01	Wed	Pulling conduit into manhole	Phase 1				Yes			Checked the comparability of Contractor and ENSR turbidity meters to calibrated standards. Contractor scales back monitoring due reduced on-water work.
26-Jul-01	Thur									Only worked until 1000am due to heavy rain.
27-Jul-01	Fri	Concrete capping of cable landing (New Bedford)	Phase 1		4 - 14	2.6 - 6.6				Lowest DO reading 0700. pH at cell opening 7.02 - 7.42.
28-Jul-01	Sat	Conduit ballasting Handling excavated materials	Phase 1		4 - 11	3.2 - 7.8				Lowest DO reading 0630. pH at cell opening 5.72 - 6.81
30-Jul-01	Mon	Conduit ballasting Handling excavated materials	Phase 1		4 - 16	5.6 - 11.1				pH 5.59 - 5.67
31-Jul-01	Tue	Handling excavated materials	Phase 1		4 - 12	4.9 - 10.6				
01-Aug-01	Wed	Conduit ballasting Pouring concrete	Phase 1		3 - 13	5.8 - 12.3	Yes			Discovered Contractors pH probe was damaged/inoperative - probe replaced, no calibration standards available. pH readings from 7/28/01 considered suspect.

**Daily Activity Summary - Construction of the Commonwealth Electric Cable Crossing
New Bedford Harbor Superfund Site**

Date		Construction Activity	Construction sequence	Contractor Monitoring			USACE Monitoring			Notes:
				TSS (mg/L)	Observed Turbidity (NTU)	Observed D.O. (mg/L)	Independent Oversight	Observed Turbidity (NTU)	Sampling Level	
02-Aug-01	Thur	Pouring concrete	Phase 1		3 - 13	5.5 - 11.4		2 - 16		ENSR collects (1) TSS/Turbidity sample from cell contents. Contractor records pH 7.40 - 7.93, no calibration standards available.
03-Aug-01	Fri	Pouring concrete	Phase 1		3 - 12	5.6 - 9.3				pH 7.40 - 7.86
04-Aug-01	Sat	No Construction								
06-Aug-01	Mon	Pouring concrete	Phase 1		4 - 12	3.9 - 12.1	Yes			Lowest DO reading at 0830. pH 7.20 - 8.25 Oversight report 05
07-Aug-01	Tue	Pouring concrete	Phase 1		1 - 18	5.0 - 12.6				Lowest DO reading at 0845. pH 7.35 - 8.05
08-Aug-01	Wed	Pouring concrete	Phase 1		1 - 11	4.2 - 14.1				Lowest DO reading at 0745. pH 7.07 - 7.81
09-Aug-01	Thur	Pouring concrete	Phase 1		2 - 8	4.5 - 6.9				pH 7.20 - 7.51, Construction only until 1035.
10-Aug-01	Fri	Pouring concrete	Phase 1		3 - 9	6.3 - 10.9				pH 7.59 - 7.78
11-Aug-01	Sat	Pouring concrete Surveying	Phase 1		5 - 13	2.4 - 4.7				pH 7.07 - 7.29 Monitoring performed until construction stops at 1000, Contractor surveying site for remainder of day.
13-Aug-01	Mon	Backfilling material from containment bay to conduit bay	Phase 1		1 - 16	1.2 - 8.9				
14-Aug-01	Tue	Backfilling material from containment bay to conduit bay	Phase 1		3 - 13	2.3 - 10.3	Yes			Oversight report 06
15-Aug-01	Wed	Sheet pile extraction (Centerline bulkhead)	Phase 1		2 - 16	2.3 - 12.3				
6-Aug-01	Thur	Sheet pile extraction (Centerline bulkhead)	Phase 1		4 - 17	2.9 - 13.7				
17-Aug-01	Fri	Backfilling material from containment bay to conduit bay	Phase 1		2 - 28	5.5 - 8.6		4 - 17	1	A visual plume was discovered emanating from the eastern end of cofferdam. ENSR collects a sample from the 300-ft mixing zone for chemistry and acute toxicity. Samples collected at NBCE1 and EREF were not analyzed.
18-Aug-01	Sat	Backfilling material from containment bay to conduit bay Extending north bulkhead to Acushnet shore (Phase 2)	Phase 1 Phase 2		2 - 36	3.5 - 10.4				Visual plume from eastern end of cofferdam
20-Aug-01	Mon	Backfilling material from containment bay to conduit bay Extending north bulkhead to Acushnet shore (Phase 2)	Phase 1 Phase 2		5 - 71	3.2 - 7.5	Yes			Contractor repositions barge at low tide generating a turbidity exceedance 300-ft down-current (south) (71 NTU). Oversight report 07
21-Aug-01	Tue	Sheet pile driving (Phase 2) Sheet pile extraction (Phase 1)	Phase 1 Phase 2		2 - 11	2.9 - 9.1				
22-Aug-01	Wed	Sheet pile driving (Phase 2) Sheet pile extraction (Phase 1)	Phase 1 Phase 2		3 - 21	2.7 - 11.1				
23-Aug-01	Thur	Sheet pile driving (Phase 2) Sheet pile extraction (Phase 1)	Phase 1 Phase 2		4 - 16	4.1 - 10.5	Yes			ENSR collects a sample from within the cofferdam prior to the Contractor removing the first sheet piles to open coffer dam. Oversight report 08
24-Aug-01	Fri	Sheet pile driving (Phase 2) Sheet pile extraction (Phase 1)	Phase 1 Phase 2		4 - 19	4.5 - 9.2				
25-Aug-01	Sat	Sheet pile driving (Phase 2) Sheet pile extraction (Phase 1)	Phase 1 Phase 2		6 - 25	5.0 - 9.5				
27-Aug-01	Mon	Sheet pile extraction (Phase 1)	Phase 1 Phase 2		4 - 45	3.6 - 8.8		6 - 22	1	Contractor monitoring records a turbidity plume from cofferdam (dredged material cell). Turbidity 300-ft north as high as 45 NTU. ENSR monitoring shortly afterwards detects an elevated, albeit weaker signal (22 NTU). No samples were collected.
28-Aug-01	Tue	Sheet pile extraction (Phase 1)	Phase 1 Phase 2		3 - 20	2.7 - 7.2		4 - 8		ENSR turbidity monitoring only

**Daily Activity Summary - Construction of the Commonwealth Electric Cable Crossing
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Date		Construction Activity	Construction sequence	Contractor Monitoring			USACE Monitoring			Notes:
				TSS (mg/L)	Observed Turbidity (NTU)	Observed D.O. (mg/L)	Independent Oversight	Observed Turbidity (NTU)	Sampling Level	
29-Aug-01	Wed	Sheet pile extraction (Phase 1)	Phase 1 Phase 2		2 - 27	3.2 - 8.1				
30-Aug-01	Thur	Sheet pile driving (Phase 2)	Phase 1 Phase 2		4 - 17	2.0 - 6.9				
31-Aug-01	Fri	Sheet pile driving (Phase 2)	Phase 1 Phase 2		5 - 18	3.5 - 5.1				
04-Sep-01	Tue	Sheet pile driving (Phase 2) Sheet pile extraction (Phase 1)	Phase 1 Phase 2		6 - 26	4.9 - 9.4				
05-Sep-01	Wed	Sheet pile extraction (Phase 1)	Phase 1 Phase 2		5 - 19	4.8 - 9.5				
06-Sep-01	Thur	Sheet pile extraction (Phase 1)	Phase 1 Phase 2		3 - 20	5.1 - 11.3			2	
07-Sep-01	Fri	Sheet pile driving (Phase 2) Sheet pile extraction (Phase 1)	Phase 1 Phase 2		4 - 24	6.2 - 11.4				
08-Sep-01	Sat	Sheet pile driving (Phase 2)	Phase 1 Phase 2		6 - 15	5.2 - 9.1				
10-Sep-01	Mon	Sheet pile driving (Phase 2) Sheet pile extraction (Phase 1)	Phase 1 Phase 2		7 - 21	3.7 - 10.5				
11-Sep-01	Tue	Sheet pile driving (Phase 2) Sheet pile extraction (Phase 1)	Phase 1 Phase 2		7 - 23	5.0 - 12.1				
12-Sep-01	Wed	Sheet pile driving (Phase 2)	Phase 1 Phase 2		7 - 27	4.1 - 9.4				
13-Sep-01	Thur	Sheet pile extraction (Phase 1)	Phase 1 Phase 2		7 - 20	5.4 - 9.7				
14-Sep-01	Fri	Sheet pile extraction (Phase 1)	Phase 1 Phase 2		8 - 26	4.9 - 5.6	Yes			
15-Sep-01	Sat	Sheet pile driving (Phase 2)	Phase 1 Phase 2		7 - 21	5.4 - 6.0				
17-Sep-01	Mon	Sheet pile driving (Phase 2)	Phase 1 Phase 2		5 - 18	4.5 - 6.8				
18-Sep-01	Tue	Sheet pile driving Trench excavation	Phase 2		4 - 22	4.6 - 7.7	Yes			Water overtopped sheet pile of south bulkhead - excavation discontinued until tide dropped below top of sheet pile. Oversight report 09
19-Sep-01	Wed	Sheet pile driving Trench excavation	Phase 2		9 - 32	5.1 - 7.9				
20-Sep-01	Thur	Sheet pile driving Trench excavation	Phase 2		3 - 34	6.0 - 7.7		4 - 15	1	All chemistry samples archived, acute toxicity analyzed.
21-Sep-01	Fri	Sheet pile driving Trench excavation	Phase 2		5 - 21	4.7 - 5.8				
22-Sep-01	Sat	Sheet pile extraction (Phase 1)	Phase 1 Phase 2		5 - 34	4.2 - 6.8				
24-Sep-01	Mon	Trench excavation/grading bed Materials handling	Phase 2		3 - 13	4.6 - 14.7				
25-Sep-01	Tue	Sheet pile driving Grading bed	Phase 2		4 - 17	6.6 - 9.4				
26-Sep-01	Wed	Trench excavation/grading bed Sheet pile driving	Phase 2		5 - 14	3.4 - 14.3	Yes			Oversight report 10
27-Sep-01	Thur	Trench excavation Conduit assembly	Phase 2		7 - 17	4.5 - 12.8				
28-Sep-01	Fri	Trench excavation Conduit assembly Sheet pile driving	Phase 2		5 - 17	4.9 - 8.7				
01-Oct-01	Mon	Sheet pile driving. Conduit installation. Shore construction (New Bedford)	Phase 1 Phase 2		4 - 12	7.0 - 7.7				
02-Oct-01	Tue	Sheet pile driving. Trench excavation. Shore construction (New Bedford)	Phase 1 Phase 2		2 - 12	6.5 - 10.1				

**Daily Activity Summary - Construction of the Commonwealth Electric Cable Crossing
New Bedford Harbor Superfund Site**

Date		Construction Activity	Construction sequence	Contractor Monitoring			USACE Monitoring			Notes:
				TSS (mg/L)	Observed Turbidity (NTU)	Observed D.O. (mg/L)	Independent Oversight	Observed Turbidity (NTU)	Sampling Level	
03-Oct-01	Wed	Sheet pile driving Conduit installation. Shore construction (New Bedford)	Phase 1 Phase 2		2 - 20	6.3 - 10.2	Yes			
04-Oct-01	Thur	Trench excavation Sheet pile extraction	Phase 1		4 - 16	6.7 - 12.5				
05-Oct-01	Fri	Trench excavation Sheet pile extraction. Shore construction (New Bedford)	Phase 1 Phase 2		3 - 13	7.0 - 13.2				
06-Oct-01	Sat	Trench excavation Shore construction (New Bedford)	Phase 1 Phase 2		9 - 24	7.1 - 7.5				
08-Oct-01	Mon	No Construction Columbus Day								
09-Oct-01	Tue	Sheet pile driving Surveying	Phase 1 Phase 2		2 - 11	8.2 - 12.9				
10-Oct-01	Wed	Sheet pile driving/grading of bed at both cable landings	Phase 1 Phase 2		2 - 16	8.5 - 12.3				
11-Oct-01	Thur	Sheet pile driving/grading of bed Surveying	Phase 2		3 - 13	9.4 - 12.6	Yes			
12-Oct-01	Fri	Sheet pile driving Shore construction (New Bedford)	Phase 1 Phase 2		3 - 11	8.6 - 10.3				
13-Oct-01	Sat	Sheet pile driving. Trenching and pouring of concrete at New Bedford cable landing	Phase 1 Phase 2		3 - 11	8.4 - 10.3				
15-Oct-01	Mon	No water operations								
16-Oct-01	Tue	Conduit assembly Material handling	Phase 1 Phase 2		3 - 7	7.3 - 7.4				Monitoring vessel moved into cofferdam to assist with survey.
17-Oct-01	Wed	Sheet pile extraction Material handling	Phase 1 Phase 2		4 - 12	7.3 - 7.9				
18-Oct-01	Thur	Conduit assembly Sheet pile extraction	Phase 1 Phase 2		2 - 13	6.9 - 7.7				
19-Oct-01	Fri	Conduit assembly Sheet pile extraction	Phase 1 Phase 2		1 - 8	6.5 - 7.9	Yes			
20-Oct-01	Sat	No Construction								
22-Oct-01	Mon	Conduit installation Barge positioning Soldier pile removals (Phase 1)	Phase 1 Phase 2		0 - 6	7.0 - 8.5	Yes			
23-Oct-01	Tue	Conduit installation								No monitoring- Monitoring vessel used inside cofferdam
24-Oct-01	Wed	Conduit installation								No monitoring- Monitoring vessel used inside cofferdam
25-Oct-01	Thur	Shore Construction (Acushnet)	Phase 2		<4	7.0 - 7.6				Monitoring began about 12:30
26-Oct-01	Fri	Conduit installation Shore Construction (Acushnet)			3 - 8	4.9 - 8.3				
27-Oct-01	Sat									No data report available
29-Oct-01	Mon	Fusing conduit	Phase 1 Phase 2							No data report available
30-Oct-01	Tue		Phase 1 Phase 2							No water quality monitoring performed
31-Oct-01	Wed									No water quality monitoring performed
01-Nov-01	Thur	Excavating shore landing (Acushnet) Working inside manhole on New Bedford side.	Phase 1 Phase 2				Yes			No water quality monitoring performed

**Daily Activity Summary - Construction of the Commonwealth Electric Cable Crossing
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Date		Construction Activity	Construction sequence	Contractor Monitoring			USACE Monitoring			Notes:
				TSS (mg/L)	Observed Turbidity (NTU)	Observed D.O. (mg/L)	Independent Oversight	Observed Turbidity (NTU)	Sampling Level	
02-Nov-01	Fri									No water quality monitoring performed
03-Nov-01	Sat									No water quality monitoring performed
05-Nov-01	Mon									No water quality monitoring performed
06-Nov-01	Tue	Excavating shore landing (Acushnet) Dewatering manhole on New Bedford side.	Phase 1 Phase 2		<3	8.2 - 8.7				
07-Nov-01	Wed	Sealing New Bedford manholes Trench excavation Sheet pile driving on Acushnet side	Phase 1 Phase 2		<2	7.8 - 8.7				
08-Nov-01	Thur	Securing conduit, pulling sheet piles (New Bedford) Trench excavation/surveying on (Acushnet)	Phase 1 Phase 2		<2	8.0 - 9.4	Yes			
09-Nov-01	Fri	Cutting/removing sheet pile (New Bedford) Trench excavation Surveying/positioning conduit (Acushnet)	Phase 1 Phase 2		<3	8.7 - 9.2				
10-Nov-01	Sat									No water quality monitoring performed
12-Nov-01	Mon	No Construction Veterans Day								
13-Nov-01	Tue									No water quality monitoring performed
14-Nov-01	Wed	Fusing conduit (New Bedford) Material handling (Acushnet)	Phase 1 Phase 2		0 - 13	8.5 - 8.8				
15-Nov-01	Thur	Conduit installation (Acushnet)					Yes			No water quality monitoring performed
16-Nov-01	Fri	Conduit splicing	Phase 1 Phase 2		<3	7.8 - 8.9				
17-Nov-01	Sat									No data report available
19-Nov-01	Mon									No data report available
20-Nov-01	Tue									No data report available
21-Nov-01	Wed	Conduit installation/ballasting	Phase 1 Phase 2				Yes			
22-Nov-01	Thur	No Construction Thanksgiving Day								
23-Nov-01	Fri									No data report available
24-Nov-01	Sat									No data report available
26-Nov-01	Mon									No data report available
27-Nov-01	Tue									No data report available
28-Nov-01	Wed	Conduit installation/ballasting	Phase 1 Phase 2				Yes			
29-Nov-01	Thur									No data report available
30-Nov-01	Fri									No data report available
01-Dec-01	Sat	Conduit installation/ballasting Material handling	Phase 1 Phase 2		1 - 17	8.2 - 8.7				
03-Dec-01	Mon	Material handling Tremie line installation	Phase 1 Phase 2		0 - 19	7.3 - 8.4				
04-Dec-01	Tue	Installing tremie line Ballasting/fusing conduit	Phase 1 Phase 2		<2	8.6 - 8.8				

**Daily Activity Summary - Construction of the Commonwealth Electric Cable Crossing
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Date		Construction Activity	Construction sequence	Contractor Monitoring			USACE Monitoring			Notes:
				TSS (mg/L)	Observed Turbidity (NTU)	Observed D.O. (mg/L)	Independent Oversight	Observed Turbidity (NTU)	Sampling Level	
05-Dec-01	Wed									No data report available
06-Dec-01	Thur	Installing tremie line Ballasting/fusing conduit Surveying	Phase 1 Phase 2							
07-Dec-01	Fri	Ballasting/fusing conduit Surveying	Phase 2				Yes			
08-Dec-01	Sat	Fusing/flushing conduit Surveying	Phase 1 Phase 2							
10-Dec-01	Mon	Pouring concrete	Phase 1 Phase 2		<5	6.9 - 9.3				pH 7.58-7.65
11-Dec-01	Tue	Pouring concrete	Phase 2		<3	8.5 - 9.3				pH 6.75-7.69
12-Dec-01	Wed	Pouring concrete	Phase 2		0 - 7	8.1 - 9.2				pH 6.87-7.69
13-Dec-01	Thur	Pouring concrete	Phase 2		<2	9.2 - 9.9				pH 6.70-7.83
14-Dec-01	Fri	Pouring concrete	Phase 2		0 - 7	8.1 - 8.9				pH 6.91-7.75
15-Dec-01	Sat	Pouring concrete	Phase 2		0 - 7	8.1 - 8.6				pH 7.20-7.69
17-Dec-01	Mon									No data report available
18-Dec-01	Tue	Material handling	Phase 2		<3	9.3 - 10.1				pH 7.13-7.56
19-Dec-01	Wed	Material handling	Phase 2		<2	8.8 - 9.9				pH 7.06-7.53
20-Dec-01	Thur	Material handling	Phase 2		<2	9.4 - 10.1				pH 7.08-7.71
21-Dec-01	Fri	Material handling	Phase 2		<4	8.7 - 9.4	Yes			pH 6.75-7.77
24-Dec-01	Mon									Silt under conduit removed to lower conduit. Steel plate added to protect conduit at more exposed point.
25-Dec-01	Tue	No Construction Christmas Day								
26-Dec-01	Wed									
27-Dec-01	Thur									
28-Dec-01	Fri	Material handling Conduit repositioning	Phase 2		1 - 14	9.8 - 10.3				pH 7.09-7.71
29-Dec-01	Sat									Contractor working to lower conduit
31-Dec-01	Mon									No data report available
01-Jan-02	Tue	No Construction New Year's Day								
02-Jan-02	Wed									No data report available
03-Jan-02	Thur									No data report available
04-Jan-02	Fri									No data report available
05-Jan-02	Sat									No data report available
07-Jan-02	Mon	Material handling Conduit repositioning	Phase 2		3 - 6	10.9 - 11.3	Yes			
08-Jan-02	Tue	Material handling Conduit repositioning	Phase 2		3 - 9	10.0 - 11.4				
09-Jan-02	Wed									No data report available
10-Jan-02	Thur									No data report available
11-Jan-02	Fri	Surveying	Phase 2							Checking integrity of conduit before completing concrete addition
12-Jan-02	Sat									No data report available

**Daily Activity Summary - Construction of the Commonwealth Electric Cable Crossing
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Date		Construction Activity	Construction sequence	Contractor Monitoring			USACE Monitoring			Notes:
				TSS (mg/L)	Observed Turbidity (NTU)	Observed D.O. (mg/L)	Independent Oversight	Observed Turbidity (NTU)	Sampling Level	
14-Jan-02	Mon									No data report available
15-Jan-02	Tue									No data report available
16-Jan-02	Wed	Conduit clearing	Phase 2				Yes			
17-Jan-02	Thur									No data report available
18-Jan-02	Fri									No data report available
19-Jan-02	Sat									No data report available
21-Jan-02	Mon									No data report available
22-Jan-02	Tue									No data report available
23-Jan-02	Wed									No data report available
24-Jan-02	Thur									No data report available
25-Jan-02	Fri	Backfilling and pulling sheets	Phase 2				Yes			
26-Jan-02	Sat									No data report available
28-Jan-02	Mon									No data report available
29-Jan-02	Tue									No data report available
30-Jan-02	Wed	Surveying	Phase 2				Yes			
31-Jan-02	Thur	Backfilling material from containment bay to conduit bay	Phase 2		0 - 12	10.9 - 11.9				
01-Feb-02	Fri	Backfilling material from containment bay to conduit bay	Phase 2		1 - 9	11.2 - 12.1				
02-Feb-02	Sat									No data report available
04-Feb-02	Mon	Backfilling material from containment bay to conduit bay	Phase 2		<4	10.7 - 11.7				ENSR collected a grab sample of cell contents, an up current reference, and a 2-hour composite sample from two down current stations (NBCE-1 and NBCE-2)
05-Feb-02	Tue	Backfilling material from containment bay to conduit bay	Phase 2		<4	10.7 - 12.1				
06-Feb-02	Wed	Backfilling material from containment bay to conduit bay	Phase 2		0 - 11	11.7 - 12.5				
07-Feb-02	Thur	Backfilling material from containment bay to conduit bay	Phase 2		2 - 9	10.9 - 12.3				
08-Feb-02	Fri	Backfilling material from containment bay to conduit bay	Phase 2		2 - 10	11.2 - 12.3				
09-Feb-02	Sat									No data report available
11-Feb-02	Mon	Sheet pile extraction	Phase 2		3 - 9	10.6 - 11.8				
12-Feb-02	Tue	Sheet pile extraction	Phase 2		0 - 11	10.9 - 11.5				
13-Feb-02	Wed	Sheet pile extraction	Phase 2		3 - 11	10.4 - 11.4				
14-Feb-02	Thur									
15-Feb-02	Fri	Sheet pile extraction	Phase 2		2 - 9	10.9 - 11.4				
16-Feb-02	Sat									No data report available
18-Feb-02	Mon									No data report available
19-Feb-02	Tue	Sheet pile extraction	Phase 2		<4	10.6 - 12.0				

**Daily Activity Summary - Construction of the Commonwealth Electric Cable Crossing
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Date		Construction Activity	Construction sequence	Contractor Monitoring			USACE Monitoring			Notes:
				TSS (mg/L)	Observed Turbidity (NTU)	Observed D.O. (mg/L)	Independent Oversight	Observed Turbidity (NTU)	Sampling Level	
20-Feb-02	Wed	Sheet pile extraction	Phase 2		<4	10.7 - 12.0				
21-Feb-02	Thur	Sheet pile extraction	Phase 2		0 - 14	10.7 - 12.0				
22-Feb-02	Fri	Sheet pile extraction	Phase 2		0 - 12	10.7 - 12.3				
23-Feb-02	Sat									No data report available
25-Feb-02	Mon									No data report available
26-Feb-02	Tue	Sheet pile extraction	Phase 2		<5	12.0 - 12.9				
27-Feb-02	Wed	Sheet pile extraction	Phase 2		<5	10.1 - 11.8				
28-Feb-02	Thur									No data report available
01-Mar-02	Fri	Sheet pile extraction	Phase 2		<4	10.1 - 10.9				
02-Mar-02	Sat									No data report available
04-Mar-02	Mon	Sheet pile extraction	Phase 2		<5	9.6 - 10.1				
05-Mar-02	Tue	Sheet pile extraction	Phase 2		0 - 7	9.7 - 11.4				
06-Mar-02	Wed	Sheet pile extraction	Phase 2		<5	10.1 - 11.4				
07-Mar-02	Thur	Sheet pile extraction	Phase 2		0 - 13	9.2 - 10.9				
08-Mar-02	Mon	Final grading	Phase 1 Phase 2					8 - 41		No samples collected, No exceedances observed



Appendix D

Monitoring Summaries Prepared During the Project

Wolf, Steve

From: Wolf, Steve
On: Friday, March 30, 2001 3:23 PM
'Barbara Bergen (E-mail)'; Davis, Robert W NAE; dickerson.dave@epa.gov; 'Jim Brown (USEPA)'; L'heureux, Paul G NAE; Mackay, Joseph B NAE; maurice.beaudoin@usace.army.mil; 'nelson.william@epamail.epa.gov'
Cc: Boye, Don; Evans, Marie; Lewis, Dion; McGrath, Debbie; Mitchell, Dave; Morin, Isabelle; Wandland, Kristen; Worthy, Mike
Subject: NBH ComE - WQ Update 01

Update 01 - 30 March 2001 to the Water Quality Monitoring Decision Committee
New Bedford Harbor Superfund Site - ComElectric Conduit Crossing

Website - By now you should have received instructions on how to access the extranet site where monitoring data will be posted. Please contact me if you have had any problems logging in or if you have any questions or comments.

Monitoring Schedule - The construction work performed this week was limited to on-shore areas, and no water quality monitoring was required. Shoreline work is anticipated to begin in Monday, 2 April, as well as transit of the float system from the lower to the upper harbor. The OHI (ComElectric) and ENSR (Corps) monitoring programs will be initiated on Monday as well.

Communication - You will be receiving regular email during the construction startup providing a summary of the monitoring as well as a note of when new data are posted on the website. Should there be any exceedence of the set criteria, you will be notified by phone and, depending on the circumstances, a conference call will be set up. Please let me know if you have alternate email addresses or phone numbers for contact. I am also very interested in any suggestions you have on improving the communication process as the project moves forward.

Thanks, Steve

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

Update 02 - 6 April 2001 to the Water Quality Monitoring Decision Committee
New Bedford Harbor Superfund Site - ComElectric Conduit Crossing

Water Quality Monitoring Decision Committee - If your name appears in the "To" list for this email, you were named as a member of the committee to review monitoring data and make recommendations should water quality issues arise during the ComElectric conduit construction. This is the proposed process - you will receive regular emails updating you on the construction work and summarizing the related monitoring. The emails will inform you when new data have been posted on the extranet site and highlight any items of potential concern. Should the turbidity levels or water column toxicity exceed the set thresholds, you will be notified by phone and email, and a conference call will be set up to review the specific issue.

Website - Please contact me if you have had any problems logging in or if you have any questions or comments.

Week Ending 6 April Construction/Monitoring Summary - The construction work performed this week was limited to on-shore areas with the exception of some shoreline work (performed from onshore) on 6 April. The OHI (ComElectric) monitoring program was initiated with some trials earlier in the week and with performance of required monitoring on 6 April. Turbidity values were quite low (1-2 NTU) and no elevation above background was recorded at the downstream transects. The ENSR (Corps) monitoring program was also initiated with some trials earlier in the week to monitor background conditions. With the large discharge of the Acushnet River after the previous week's precipitation, both turbidity and salinity were quite low.

Week Beginning 9 April Schedule - Shoreline work from the onshore crane is expected to resume on Monday, 9 April. The transit of the float system from the Lower Harbor is expected during the lower stage of the tide on the afternoon of 9 April. Nearshore sheetpile driving (both from onshore and from the float) should continue through the week. OHI is scheduled to perform the required monitoring throughout the week. ENSR is scheduled to provide oversight to the monitoring on 9 April and will likely commence with sampling on 10 April.

On-Site Meeting - Skip Nelson noted that he could come up from Narragansett to review the monitoring decision criteria the next time folks were scheduled to be in New Bedford with a little free time. This would also be an opportunity to inspect the completed Station 2 underneath the Coggeshall St. Bridge.
[Jim Brown and Dave Dickerson - please let me know what days you may be in New Bedford with a little free time during the week of 9 April or 16 April.]

Please contact me if you have questions or comments - Steve

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

Update 03 - 16 April 2001 to the Water Quality Monitoring Decision Committee
New Bedford Harbor Superfund Site - ComElectric Conduit Crossing

Water Quality Monitoring Decision Committee – A meeting was held in New Bedford to review the current construction/monitoring status as well as the decision criteria for the toxicity testing. The meeting was attended by Jay Mackay, Paul L'Heureux, Moe Beaudoin, Skip Nelson, Steve Wolf (ENSR), Don Boye (ENSR), Marie Evans (ENSR), and Dave Mitchell (ENSR). Clarification of the decision factors for the toxicity testing were discussed, and the revised summary sheet will be posted on the web site.

Week Ending 13 April Construction/Monitoring Summary - The construction work performed this week consisted primarily of on-shore and shoreline work (performed from onshore). The float system for the crane was brought up from the Lower Harbor on 9 April, and the float system for support was brought up on 13 April. The OHI (ComElectric) monitoring operated throughout the week during periods of float transit or shoreline work. Although turbidity was elevated in the immediate work area during float positioning at the site, no excursions above background were noted at the downstream transects. Turbidity values were low (<5 NTU). Dissolved oxygen concentrations ranged between 9 and 11 mg/L. With the limited in-water work, the ENSR (Corps) monitoring was limited to oversight.

Week Beginning 16 April Schedule – No work on 16 April (holiday). Continued setup of the crane and support float system are anticipated for 17 April, and driving of sheet in the near shore area is expected to begin on 18 April and continue throughout the rest of the week. OHI is scheduled to perform the required monitoring throughout the week. ENSR is scheduled to provide oversight to the monitoring on 17 April and will likely commence with sampling on 18 April.

On-Site Meeting – A meeting to review monitoring data is currently scheduled to follow the 0800 construction schedule meeting on **Thursday, 26 April**.

Please contact me if you have questions or comments - Steve

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

Update 04 - 24 April 2001 - Water Quality Monitoring
New Bedford Harbor Superfund Site - Com Electric Conduit Crossing

Week Ending 20 April

Construction Summary - No work was performed on 16 April (Patriots Day). The construction work performed during the remainder of the week consisted of driving sheet pile on the western side of the crossing using the float-mounted crane as well as support activities (repositioning barge and loading sheet pile on the supply float).

Com Electric (OHI) Monitoring - OHI performed monitoring periodically each day during in-water construction activities. No visual elevations in turbidity were noted beyond the immediate construction area (within 50 feet). Turbidity measurements at the transect 300 feet down current of the construction were generally less than 5 NTU with a maximum of 9 NTU.

Corps (ENSR) Monitoring - ENSR provided oversight to the OHI monitoring on 17 April and performed independent monitoring and sampling on 19-20 April. Turbidity measurements performed on 19 April were similar to those of OHI (<10 NTU). Preliminary data from toxicity testing revealed 100% survival of test organisms, and analytical data (TSS and dissolved Cu, Pb, PCB) were similar at the reference and down current stations.

During monitoring on 20 April, periodic spikes of elevated turbidity (~100 NTU) were noted during performance of one of the 300-foot down current transects. Background turbidity was measured at <10 NTU. This elevation was attributed to propwash from the support vessel that had been repositioning the float prior to performance of the transect. Turbidity levels had returned to approximately 10 NTU above background at the 300-foot down current transect approximately one hour later. Preliminary data from toxicity testing revealed 100% survival of test organisms from the down current composite sample at station NBCE-1 (300 feet down current of construction activities). Concentrations of TSS and dissolved Cu, Pb, and PCB were higher at station NBCE-1 by a factor of two as compared to the background station and the more distant down current station NBCE-2 (Coggeshall St. Bridge).

Dissolved Oxygen/Water Quality - Measurements of DO performed by OHI ranged from 8.1 to 10.2 mg/L. Salinity ranged from 8 to 29 ppt, and temperature ranged from 8 to 14°C. Measurements performed by ENSR were in a similar range with DO saturation ranging from over 100% in surface waters to approximately 80% near the bottom. A distinct fresh water lens was apparent in the upper water column.

Week Beginning 23 April Schedule

Continued driving of sheet pile is expected for the entire week. OHI is scheduled to perform the required monitoring throughout the week. ENSR is scheduled to provide independent monitoring on three days during the week.

On-Site Meeting

A meeting to review the monitoring program and data is currently scheduled for 0800 on **Thursday, 26 April** with the construction meeting following at 0900.

Please contact me if you have questions or comments - Steve

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

Update 05 – 01 May 2001 - Water Quality Monitoring
New Bedford Harbor Superfund Site – Com Electric Conduit Crossing

Week Ending 27 April

Construction Summary – Construction of the northern wall was completed, and construction of the middle wall began on Wednesday, 25 April. Each day (different time each day) the materials barge was moved to shore to re-load with sheetpile and then moved back off shore. The remainder of each day was spent driving sheetpile using the float-mounted crane.

Com Electric (OHI) Monitoring – OHI performed monitoring periodically each day during in-water construction activities and barge movements. No visual elevations in turbidity were noted beyond the immediate construction area (within 50 feet). Turbidity measurements at the transect 300 feet down current of the construction were generally less than 9 NTU with a maximum of 32 NTU during barge movement on 25 April.

Corps (ENSR) Monitoring – ENSR performed independent monitoring on 24, 25, and 27 April and sampling on 24 and 27 April. Turbidity measurements performed on 24 April were generally higher than those of OHI (<10 NTU). ENSR measured turbidity consistently at 6 NTU for the mid water column for active sheet pile driving 300 feet down current of the operation. Slightly higher values (10-15 NTU) were recorded closer to the surface, and values of 60-70 NTU were recorded just above the bottom. During barge movement on 24 April, ENSR recorded turbidity values of 8-10 NTU near the surface and 30-40 NTU just above the bottom at 300 feet down-current. Turbidity measurements performed by ENSR on 25 April (generally <10 NTU except during barge movement) and 27 April (generally <11 NTU) were very similar to those of OHI.

Preliminary data from toxicity testing on 24 and 27 April revealed good survival of test organisms for all stations. For the ebb tide monitoring on 24 April, TSS and dissolved Cu, Pb, and PCB were lowest at the Coggeshall St. Bridge (station NBCE-2). Concentrations at the 300-foot down current station (NBCE-1) and the reference station were similar for all parameters and were slightly higher than at the Coggeshall St. Bridge. For the flood tide monitoring on 27 April, concentrations of TSS and dissolved Cu and Pb were slightly higher at the 300 foot down current station relative to the reference station, and dissolved PCB concentrations were similar.

Dissolved Oxygen/Water Quality – Measurements of DO performed by OHI ranged from 7.1 to 9.5 mg/L. Salinity ranged from 12.3 to 29.9 ppt, and temperature ranged from 10.5 to 17.7°C.

Week Beginning 30 April Schedule

Continued driving of sheet pile is expected for the entire week. OHI is scheduled to perform the required monitoring throughout the week. ENSR is scheduled to provide independent monitoring on two days during the week and oversight of OHI on one day.

Review Meeting

A meeting to review the monitoring program and data is currently scheduled for 0800 on **Friday 11 May** at the USACE field office with the construction meeting following at 0900.

Please contact me if you have questions or comments - Steve

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

Update 06 – 08 May 2001 - Water Quality Monitoring
New Bedford Harbor Superfund Site – Com Electric Conduit Crossing

Week Ending 04 May

Construction Summary – Construction of the middle wall was completed, and construction of the southern wall began on Thursday, 03 May. Each day at a different time the materials barge was moved to shore to re-load with sheetpile and then moved back off shore. The remainder of each day was spent driving sheetpile using the float-mounted crane.

Com Electric (OHI) Monitoring – OHI performed monitoring periodically each day during in-water construction activities and barge movements. No visual elevations in turbidity were noted beyond the immediate construction area (within 50 feet). Turbidity measurements at the transect 300 feet down current of the construction activity were less than 5 NTU.

Corps (ENSR) Monitoring – ENSR performed independent monitoring on 03 and 04 May and sampling on 03 May. Turbidity measurements performed on both 03 and 04 May were generally slightly higher than those of OHI (ENSR recorded turbidity in the range of 5-10 NTU for both days of monitoring while OHI recorded values less than 5 NTU during this period).

Sampling was completed only for 03 May. On 04 May sampling was initiated but not completed after the planned construction activity changed from sheet pile driving to loading sheet for several hours (encompassing the major part of the tidal cycle). The sampling protocol was modified slightly on 03 May to better capture the short-term variability of the construction activity. Two stations were sampled over a portion of the ebb tide – an up current reference station and NBCE1, the 300-foot down current station. The composite sample for NBCE1 consisted of 8 aliquots of water collected at 15-minute intervals. Preliminary data from toxicity testing on the 03 May sample revealed 100% survival of test organisms for both stations. Preliminary water chemistry data indicated that TSS, total copper, total lead, and dissolved PCB concentrations were slightly higher at station NBCE1 as compared to the reference station.

Dissolved Oxygen/Water Quality – Measurements of DO performed by OHI ranged from 6.3 to 10.2 mg/L over the week. Salinity ranged from 14.6 to 24.1 ppt, and temperature ranged from 11.1 to 22.0°C. The lowest DO value of 6.3 mg/L was recorded at 0710 on Monday, 30 April. This was approximately one hour prior to low tide, and the Upper Harbor was extremely calm with no apparent wind. Measurements of DO performed by ENSR ranged from 7.4 to 8.4 mg/L with % saturation ranging from 95% to 106%.

Week Beginning 07 May Schedule

Continued driving of sheet pile is expected for the entire week, at which point the sheet pile wall will be completed. OHI is scheduled to perform the required monitoring throughout the week. ENSR is scheduled to provide independent monitoring on one day during the week and oversight of OHI on one day.

Review Meeting

A meeting to review the monitoring program and data is currently scheduled for 0800 on **Friday 11 May** at the USACE field office with the construction meeting following at 0900.

Please contact me if you have questions or comments - Steve

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

Update 07 – 14 May 2001 - Water Quality Monitoring
New Bedford Harbor Superfund Site – Com Electric Conduit Crossing

Week Ending 11 May

Construction Summary – Construction of the southern wall continued through the week and was completed on 11 May. Activities included loading sheet pile on the materials barge, driving sheet pile using the float-mounted crane, and repositioning of the floats.

Com Electric (OHI) Monitoring – OHI performed monitoring periodically each day during in-water construction activities and barge movements. No visual elevations in turbidity were noted beyond the immediate construction area (within 50 feet). Turbidity measurements at the transect 300 feet down current of the construction activity were less than 5 NTU.

Corps (ENSR) Monitoring – ENSR performed independent monitoring/sampling on 08 May and oversight on 11 May. A direct comparison of OHI and ENSR measured turbidity was performed on 08 May with the ENSR measurements consistently higher. This offset is currently being evaluated based on a review of sensor construction and laboratory measurements. ENSR sampled two stations on 08 May over a portion of the ebb tide, an up current reference station and NBCE2, the down current station located at the Coggeshall St. Bridge. Preliminary data from the toxicity testing of these samples revealed 100% survival of test organisms for both stations.

Dissolved Oxygen/Water Quality – A summary of the minimum DO measured by OHI each day is presented below.

Date	Time	DO (mg/L)	% Saturation	Temp. (°C)	Salinity(ppt)	Notes
7 May	0705	7.9	88	13.2	24.3	Maximum of 9.3 at 1305
8 May	0845	6.7	77	15.0	20.8	Maximum of 8.7 at 1320
9 May	0625	6.7	78	15.1	21.5	Maximum of 8.7 at 1305
10 May	0735	6.2	73	15.9	22.5	Maximum of 8.6 at 1100
11 May	0825	6.7	81	17.2	22.6	Maximum of 9.4 at 1340

Week Beginning 14 May Schedule

Work will proceed on closure of the eastern end of the sheet pile bays. Following closure, the float with the excavator will be reconfigured and located into the excavation bay. Excavation could begin as early as Thursday, 17 May. OHI is scheduled to perform the required monitoring during a portion of the week. No monitoring is required during reconfiguration of the float and setup within the excavation bay prior to the start of excavation. ENSR is scheduled to provide oversight of OHI monitoring should excavation begin later in the week with independent monitoring/sampling of the excavation scheduled for the week of 21 May.

Review Meeting

The next meeting to review the monitoring program and data is currently scheduled for 0800 on **Thursday 24 May** at the USACE field office with the construction meeting following at 0900.

Please contact me if you have questions or comments - Steve

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

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Update 08 – 24 May 2001 - Water Quality Monitoring
New Bedford Harbor Superfund Site – Com Electric Conduit Crossing

21-23 May Special Summary (please note week ending 18 May summary below)

Excavation of the northern bay began on Monday, 21 May, and approximately 125 feet of the bay was excavated. The dredged material was placed into the southern bay adjacent to the middle sheet pile wall. OHI monitoring revealed some turbidity elevation at the 300-foot down current station. A maximum value of 24 NTU was recorded in the afternoon representing an elevation above background of approximately 10 NTU.

On Tuesday morning, 22 May a section of the sheet pile along the southern wall was noted leaning inward (into the southern bay). The wall was intact and had not leaned far enough to allow overtopping. The instability of the wall was attributed to the pressure differential caused by the water level difference between the enclosed bay and the adjacent waters of the Upper Harbor. The original assumption was that the wall would leak slowly through the joints along its length allowing the water level within the bay to track that of the tidally influenced Upper Harbor. However, the tightness of the pile joints appears to have nearly sealed the bay.

To alleviate the water level difference on the morning of 22 May (the tide was falling, but the water level remained high within the bay) the western (New Bedford) end of the southern sheet pile wall was adjusted to allow water to drain from the bay at a low rate. This exit point was several hundred feet from the portion of the bay that received sediment the previous day, and the water exiting the bay was quite clear.

As a precautionary measure ENSR (who was on site to initiate independent monitoring for the planned excavation activities) collected a grab sample of the water exiting the bay. This sample was delivered to the labs later in the day for expedited analysis of acute toxicity and dissolved PCBs/metals. Preliminary results from the testing have revealed no apparent acute toxicity associated with this water. Additional samples were collected on 23 May as a time-weighted composite of the water exiting the bay (note that water exits the bay only during portions of the falling tide and early rising tide when the water level is higher in the enclosed bay than the surrounding Harbor waters). Preliminary results from the testing of these samples have also revealed no apparent acute toxicity.

Design modifications are currently underway to correct the southern wall instability. These modifications are expected to be completed by the week of 28 May after which excavation will resume. OHI is scheduled to perform monitoring for any modifications that require sheet-pile driving or barge movements outside of the bays. ENSR will perform independent monitoring with the resumption of excavation. Should any conditions change during design modifications, ENSR is prepared to resume independent monitoring.

Week Ending 18 May

Construction Summary – Construction during the week consisted mainly of reconfiguring the operation to shift from sheet pile driving to excavation. Some additional driving of sheets was performed on 15 May.

Com Electric (OHI) Monitoring – OHI performed monitoring on 14 May during barge movement and on 15 May during sheet pile driving. The reconfiguration operations during the remainder of the week did not require monitoring. No visual elevations in turbidity were noted beyond the immediate construction area (within 50 feet), and turbidity measurements at the transect 300 feet down current of the construction activity were less than 8 NTU on the days monitoring was performed.

Corps (ENSR) Monitoring – Given the nature of the construction activities, no independent monitoring or oversight was performed by ENSR during the 14-18 May week.

Dissolved Oxygen/Water Quality – A summary of the minimum DO measured by OHI each day is presented below.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity(ppt)	Notes
14 May	0710	6.7	77	14.8	23.6	DO above 8 mg/L by late morning
15 May	0715	6.9	80	15.5	23.9	DO approaches 9 mg/L by early afternoon

Review Meeting

The next meeting to review the monitoring program and data will be scheduled next week after the design modifications for the sheet pile have been finalized.

Please contact me if you have questions or comments - Steve

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

Update 09 – 06 June 2001 - Water Quality Monitoring
New Bedford Harbor Superfund Site – Com Electric Conduit Crossing

Week Ending 01 June

Construction Summary – No work was completed on Monday (29 May) due to the Memorial Day holiday. Tuesday through Friday Modern Continental began to drive piles as a proactive measure to stabilize the southern wall while formal engineering plans were developed. “Soldier piles” were driven in every 16 feet along the inside face of the southern wall, and the existing sheetpile sections were then clamped to the soldier piles for support.

On Friday (01 June), engineering plans were completed. The plans specify driving 35-footft support piles every 8 feet along the inside of both the center and southern walls.

Com Electric (OHI) Monitoring – OHI did not perform monitoring during the week, as the support pile driving was performed within the sheetpiled enclosure.

Corps (ENSR) Monitoring – Given the nature of the construction activities, no independent monitoring or oversight was performed by ENSR during week.

Week Beginning 4 June Schedule

Driving of the support piles is expected to continue through the week and into the week of 11 June. As this work is being performed within the sheetpiled enclosure, no OHI or ENSR monitoring is scheduled.

Review Meeting

The next meeting to review the monitoring program and data will be scheduled once it is determined when excavation (and associated monitoring) will resume.

Please contact me if you have questions or comments - Steve

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

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Update 10 – 05 July 2001 - Water Quality Monitoring
New Bedford Harbor Superfund Site – Com Electric Conduit Crossing

Two Week Period 04 through 15 June

Construction Summary – Soldier piles were driven in every 8 feet along the length of the center and southern sheet pile walls for added stabilization.

Com Electric (OHI) Monitoring – OHI did not perform monitoring during these two weeks, as the support pile driving was being performed within the sheet pile enclosure; this activity was previously shown to have no significant impact on water quality.

Corps (ENSR) Monitoring – Given the nature of the construction activities, no independent monitoring or oversight was performed by ENSR during these two weeks.

Week of 18 Through 23 June

Construction Summary – Excavation began on Monday and continued through Friday. On Saturday, 23 June sheet pile was driven on the eastern edge of the estuary to facilitate attaching the conduit assemblage once it was pulled out into the estuary, but no excavation was performed.

Com Electric (OHI) Monitoring – OHI began monitoring on a 30 minute cycle once excavation began. On 23 June (Saturday) transects were run on a reduced schedule due to the nature of construction activity (sheet pile driving).

Elevated turbidity measurements were recorded during the transect performed at 1100 on Monday 18 June during excavation. The values ranged up to 60 NTU at 300 feet down current (south, on the ebb tide) of the construction activities with background turbidity at the northern reference ranging from 8-12 NTU. A turbidity plume was visible to about 750 feet down current of the construction. Excavation was stopped because of the elevated turbidity measurements (50 NTU above background at the 300 foot down current station). The plume was determined to originate from water exiting the southeastern corner of the cofferdam. A silt curtain was immediately placed around the breach. With the shift of the tide to flood and subsequent rising waters in the Upper Harbor in the early afternoon, water levels inside and outside the cofferdam began to equalize. These combined factors resulted in a reduction of the elevated turbidity in the area. Excavation resumed in the early afternoon, with maximum down current turbidity measurements of 20 NTU.

Turbidity measurements 300 feet down current of the construction ranged between 2 and 21 NTU during the remainder of the week.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by OHI each day is presented below. A series of low values (2-4 mg/L) were reported during the week. These low values may be attributed to measurement error as the sensor membrane was periodically allowed to dry out between measurement cycles. General guidelines for instrument handling were discussed in the field and at the 22 June meeting, and this should now be resolved.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
18 June	0715	5.7	65	20.7	3.9	Minimum value recorded at background station prior to construction start - DO ranged 7-10 mg/L in afternoon.
19 June	0755	2.7	34	21.8	15.6	Minimum value recorded at down current station, just after excavation commenced – this low value

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
						was attributed to dry sensor membrane – DO ranged from 6-7 mg/L by mid morning.
20 June	0915	4.0	48	22.0	7.6	Minimum value recorded at down current station - DO ranged from 6-8 mg/L most of the day
21 June	0815	3.0	38	22.0	17.1	Minimum value recorded at down current station - DO less than 6 mg/L over most of the day
22 June						No monitoring performed
23 June	0920	4.7	61	23.0	17.4	Minimum value recorded at down current station - DO ranged from 5-7.5 over the remainder of the day

Corps (ENSR) Monitoring - Field oversight was performed on 18 June, and independent sampling/monitoring was performed on 19, 20 and 21 June. On 19 June, ENSR noted turbidity values comparable to OHI; a visual turbidity plume was noted in the same location as on 18 June, but at reduced magnitude. Values in this area ranged from 10-20 NTU. No visible plume was noted on 20 or 21 June.

The toxicity data indicate no significant differences between background and down current stations for the acute tests for all three days of monitoring. The chronic test (Mysid 7-day growth) did indicate slightly diminished growth (relative to background) for the down current Coggeshall St. Bridge station (NBCE2) on 19 June and for the station 300 feet down current (south - NBCE1) of the construction on 20 June. This sublethal effect may be the result of construction activities as dissolved PCBs and total copper and lead concentrations were also elevated at the 300 foot down current station on these days. The sublethal effect could also be attributed to lingering impacts from CSO input into the harbor during the extremely large rainfall event over the 17-18 June period. The chronic test for the 21 June samples indicated diminished growth (relative to background) for the down current station (300 feet north of construction – flood tide NBCE3). However, this result is thought to be an artifact of an elevated reported growth rate for the background sample (potentially due to salt crystal contamination during the weigh in) rather than a diminished growth rate for the down current sample. This artifact will be further discussed in the monthly data report.

Water Quality Meeting on 22 June - OHI has been training Jack Almeida (Modern Continental) to take over environmental oversight, and the transition was completed during the week. The methodology of turbidity monitoring was discussed and modified from collecting data points at every buoy to collecting a range of turbidity values across the transect and then collecting a data point for the rest of the parameters at the location of highest turbidity or the middle of the transect. The occurrence of low dissolved oxygen values was discussed and believed to be due partially to the sensor membrane drying out between transects; Modern Continental will now keep the sensor moist when not in use. Additionally, ENSR will compare readings between their meter and the meter being used by Modern Continental. The Corps and ENSR will review the laboratory TSS values (from samples collected by OHI/Modern Continental) to assess the potential for reducing the number of TSS samples collected during the week.

Week of 25 Through 30 June

Construction Summary - Monday morning 25 June, excavation began in the upland area. A barge was also positioned in the estuary to accept the ends of the conduit assemblage that was pulled out from the shore staging area. The temporary position of the conduit assemblage was to have one end fixed on shore with the end caps held out of water by the barge. The middle of the conduit was attached to temporary sheet pile driven into the estuary the previous week. Excavation work continued throughout the week.

Com-Electric (Modern Continental) Monitoring - Monitoring was not performed on 26 June as all construction activities were performed in upland areas. During movement of the conduit into the estuary, the turbidity ranged from 4-8 NTU at 300 feet down current of the operation. During excavation activities for the remainder of the week the maximum down current turbidity recorded was 28 NTU with most values less than 15 NTU. Background turbidity values generally ranged from 5-10 NTU.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by OHI each day is presented below.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
25 June	1006	4.9	64	23.5	18.1	Minimum value recorded at the down current station - DO above 6 mg/L for remainder of day
26 June						No monitoring performed
27 June	1030	5.3	72	23.9	23.1	Minimum value recorded at the background station - DO ranged from 8-12 mg/L for remainder of the day
28 June	0845	6.4	86	23.8	22.8	Minimum value recorded at the background station - DO ranged from 8-11 mg/L for remainder of the day
29 June	0740	6.3	84	23.3	21.9	Minimum value recorded at the background station prior to the start of construction - DO ranged from 7-11 mg/L for remainder of the day
30 June	0715	6.3	83	23.2	20.6	Minimum value recorded at the background station prior to the start of construction - DO ranged from 8-11 mg/L for remainder of the day

Corps (ENSR) Monitoring - ENSR preformed oversight of Com-Electric monitoring on Monday 25 June. A modified Level 4 event was scheduled for 26 June (Tuesday) which included the collection of chemistry samples (no toxicity) at NBCE1 in addition to collection of toxicity and chemistry at NBCE2. Mechanical problems with the spuds on the excavator barge forced rescheduling of this event to 27 June. Turbidity measurements generally concurred with those performed by Modern Continental. Preliminary toxicity data indicate near 100% survival for all test organisms at the Coggeshall St. Bridge station (NBCE2) relative to background. Concentrations of total copper and lead and dissolved PCB were lower than those recorded the previous week and were similar between background and down current stations.

Week Beginning 2 July Schedule

Excavation is scheduled to continue through the week (with no work scheduled for 4 July). Once excavation is completed, stone will be added to line the bottom of the cable trench, then the conduit will be moved into the cofferdam, positioned in the trench, and armored with a concrete cap. Com-Electric monitoring will be continuing during this period. ENSR will resume water quality monitoring during the pouring of concrete.

Please contact me if you have questions or comments - Steve
 Steve Wolf - ENSR International
 direct # (978) 589-3187; swolf@ensr.com
 cell # (978) 758-2498; home # (978) 263-6934

Update 11 – 27 July 2001 - Water Quality Monitoring
New Bedford Harbor Superfund Site – Com Electric Conduit Crossing

Week of 02 Through 07 July

Construction Summary – Excavation continued from Monday through Saturday. No work was completed on Wednesday 04 July due to the Fourth of July holiday.

Com Electric (Modern Continental) Monitoring – Modern Continental performed monitoring on a 30 minute cycle while excavation was being preformed.

Background turbidity values ranged from 3-12 NTU during the week. Turbidity measurements 300 feet down current of the construction ranged between 0 and 28 NTU during the week. The higher turbidity readings (28 NTU) on 3 July were associated with a limited plume emanating from the eastern end of the southern sheetpile wall. Values as high as 80 NTU were measured directly along the sheetpile wall in this area. All other transects performed during the day had turbidity values less than 20 NTU.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental each day is presented below. DO ranged from 4.9 to 9.8 mg/L during the week. Lowest DO was typically recorded in the morning (often at the background station), and values increased over the course of the day.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
2 July	0725	4.9	64	23.0	20.8	Minimum value recorded at background station prior to construction start – DO increased to 8.5 mg/L later the day.
3 July	0730	5.4	69	21.1	22.8	Minimum value recorded at background station prior to construction start. DO increased to 7.8 mg/L later in the day.
5 July	0855	4.6	58	22.0	17.7	Minimum value recorded at the background station 1000 ft north of the construction. This reference station was not the first reading of the day but rather was taken about 2 hours after the start of construction. DO increased to 8.8 mg/L later in the day.
6 July	1035	5.8	78	23.3	24.7	Minimum value recorded at down current station - DO increased to 9.8 mg/L later in the day.
7 July	0840	7.0	91	22.3	21.0	DO ranged from 7.4-8.5 mg/L the remainder of the day.

Corps (ENSR) Monitoring - Field oversight was performed on 03 July, and no independent sampling/monitoring was performed during the week. Comparison DO measurements were performed during field oversight. ENSR's meter measured values 0.4-1.1 mg/L higher than the Modern Continental field meter. ENSR's meter measured salinity values approximately 6 ppt higher than the Modern Continental field meter.

Week of 9 Through 14 July

Construction Summary – Excavation continued from Monday 9 July to Friday 13 July. Modern Continental began to lay the stone bedding on 13 July and continued to lay stone on Saturday 14 July.

Com-Electric (Modern Continental) Monitoring – Monitoring was performed each day during the week. Turbidity measurements 300 feet down current of the construction ranged from 2-22 NTU. Background turbidity values ranged from 3-14 NTU

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental each day is presented below. Lowest values were recorded in the morning, typically at the background station prior to the start of construction. Values generally increased through the day, with some values well in excess of 100% saturation recorded in the afternoon.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
9 July	0835	5.5	71	21.7	22.5	Minimum value recorded at the down current station – DO increased to 9.1 mg/L later in the day.
10 July	0820 & 0850	6.5	87	23.6	22.6	Minimum value recorded at the down current station. DO increased to 12.0 mg/L later in the day. The value of 12.0 mg/L corresponds to a saturation of 168%.
11 July	0715	7.0	95	24.1	22.8	Minimum value recorded at 1000 ft south background station. DO increased to 9.3 mg/L later in the day.
12 July	0710 & 0750	6.1	82	24.0	21.5	Minimum values recorded at 1000 ft south background and at the 300 ft down current station. DO ranged from 8.4-13.8mg/L for the remainder of the day. The value of 13.8 mg/L corresponds to a saturation of 190%.
13 July	0615	3.0	40	24.2	21.3	Minimum value recorded at the background station prior to the start of construction - DO ranged from 6.0-14.4 mg/L for remainder of the day. The value of 14.4 mg/L corresponds to a saturation of 193%.
14 July	0750	4.8	64	23.7	20.8	Minimum value recorded at the down current station. DO ranged from 5.8-8.5 mg/L for remainder of the day.

Corps (ENSR) Monitoring - ENSR performed oversight of Com-Electric monitoring on Wednesday 11 July. A Hach DO test kit and ENSR's field meter were compared with DO values measured with Modern Continental's field meter as shown in the table below. As noted in the above table, Modern Continental reported DO values well above 100% saturation. Daily cycling of DO values is expected, but some of the values were extremely high. Although Modern Continental's meter appears to be functioning properly, the extremely high measurements were not confirmed by direct comparison with a separate set of measurements.

Modern Cont Field Meter (mg/L)	ENSR Field meter (mg/L / % sat)	ENSR Hach Kit
7.1 mg/L	6.4 mg/L / 93 %	6.5 mg/L
8.3 mg/L	8.0 mg/L / 108%	

A Level 1 independent monitoring/sampling effort was completed on Tuesday 10 July to coincide with the last day of excavation within the sheetpile wall. Per EPA direction, this effort included an additional sample collected inside the silt curtain directly at the opening of the southern sheetpile wall at its western (New Bedford) end. The additional sample was analyzed for metals, PCBs and TSS/turbidity. ENSR

measured turbidity values of 2-12 NTU at the 300 ft down current location (similar to those recorded by Modern Continental). Turbidity at the silt curtain adjacent to the sheetpile wall was less than 20 NTU.

Analytical results were similar to most of the previous measurements; total copper and lead and dissolved PCB concentrations varied within a small range for the three monitoring stations (up current background, 300 foot down current, and Coggeshall St. Bridge). Lowest values were recorded at the Coggeshall St. Bridge Station. Chemistry values for the grab collected at the silt curtain (Cu at 10.6 ug/L, Pb at 13.0 ug/L, and dissolved PCB (sum of 18 NOAA congeners) at 1.9 ug/L) were approximately two to three times higher than those for the background and down current monitoring stations.

The toxicity data indicate no significant differences between background and down current stations for the acute tests (*Arbacia* fertilization, 48-hour *Champia*, and 48-hour mysid tests). The data also indicate no significant differences between background and down current stations for the 7-day chronic tests in terms of *Champia* cystocarp production and mysid survival and growth. Consequently, no monitoring criteria were exceeded. However, at the end of the 7-day chronic test period the *Champia* showed widespread necrosis (bleaching and poor frond integrity) in the algal fronds in NBCE-1 (50% lethality; 300 feet down current) and 100% lethality in NBCE-2 (further down current at the Coggeshall St. Bridge). Background and laboratory controls were not affected.

Possible causes of the necrosis include laboratory handling/procedural issues (although discussions with the laboratory have not revealed any likely laboratory-related issues); water quality impacts related to Com Electric construction (although the elevated response at the Coggeshall St. Bridge relative to the near field station does not directly support this conclusion); or, more likely, water quality impacts unrelated to construction (dry weather CSO release in the southern portion of the Upper Harbor or within the Lower Harbor). The laboratory is currently re-running the *Champia* test with water archived from the initial test to confirm the test results. Overall, the monitoring results do not display any trends or patterns to suggest that the *Champia* necrosis is related to Com Electric construction operations.

Week of 16 Through 21 July

Construction Summary – Construction activities consisted of completion of stone laying, grading of the stone, and preparation for pulling in the pipeline.

Com Electric (Modern Continental) Monitoring – Modern Continental performed monitoring on a 30 minute cycle while stone laying and grading was performed. Background turbidity values ranged from 4-11 NTU during the week. Turbidity measurements 300 feet down current of the construction ranged between 3 and 25 NTU during the week with most values less than 15 NTU.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental each day is presented below. DO ranged from 2.8 to 10.6 mg/L during the week. Lowest DO was typically recorded in the morning, and values generally increased over the course of the day.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
16 July	0745	5.4	72	23.5	22.5	Minimum value recorded at down current station prior to construction start – DO increased to 10.6 mg/L later in the day.
17 July	0645	5.3	72	23.5	24.5	Minimum value recorded at down current station prior to construction start. DO increased to 7.7 mg/L later in the day.

18 July	0630	2.8	37	22.7	23.7	Minimum value recorded at the background station 1000 ft north of the construction. DO values ranged from 3.4-8.5 mg/L during the remainder of the day.
19 July	0915	4.4	58	22.9	22.5	Minimum value recorded at down current station. DO increased to 8.1 mg/L later in the day.
20 July	0715	4.7	62	21.6	24.4	Minimum value recorded at down current station. DO increased to 10.5 mg/L later in the day.

Corps (ENSR) Monitoring - Field oversight was performed on 16 July. On 17 July, a grab sample was collected from within the sheetpile enclosed area (northern or pipeline corridor). The grab was collected at the start of the day prior to initiation of construction activities. Independent turbidity monitoring was also performed down current of the construction. The grab was analyzed for chemistry with the following results: Cu at 6.5 ug/L, Pb at 6.5 ug/L, dissolved PCBs at 1.6 ug/L, and TSS at 26 mg/L. The results of the turbidity monitoring were consistent with that performed by Modern Continental.

Week Beginning 23 July Schedule

A limited amount of sediment will be removed from just outside of the sheetpile at the eastern end, and the sheetpile at the eastern end will be temporarily removed. The pipeline will be pulled into the sheetpile enclosure, and the eastern end sheetpile will be replaced. The pipeline will then be submerged into place. Placement of the concrete cap may also be initiated this week. Modern Continental is scheduled to perform daily monitoring during in-water construction activities. ENSR is scheduled to provide oversight of Modern Continental's water quality monitoring as well as Level 1 monitoring/sampling during the excavation, sheetpile removal, and concrete placement.

Please contact me if you have questions or comments - Steve
Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

Update 12 – 15 August 2001 - Water Quality Monitoring
New Bedford Harbor Superfund Site – Com Electric Conduit Crossing

Week of 23 Through 28 July

Construction Summary –The gravel bed of the construction cell was graded on Monday, 23 July. On Tuesday, 24 July, excavation was performed outside the cell at the eastern edge of the cofferdam. Following the excavation, the end sheetpile was removed, and the conduit was moved into the cell. The rest of the week was spent positioning the conduit into the manhole on the western (New Bedford) shore, sinking the conduit in place, and concrete armoring over the landward end of the conduit. Minimal work occurred on Thursday 26 July due to heavy rain.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on a half-hour schedule during intensive work such as excavation and opening of the cofferdam. Monitoring frequency was reduced during less intensive activities. On Wednesday 25 July, Modern Continental reduced their monitoring effort because of limited work on the water and maintenance of the monitoring boat.

Background turbidity values ranged from 4-12 NTU during the week. Turbidity measurements 300 feet down current of the construction ranged between 6-34 NTU on Monday 23 July as the barge was being moved at low tide in preparation for the following day's construction activities. Before movement of the barge, the turbidity in the area had ranged from 6-12 NTU. During excavation outside of the cofferdam on Tuesday 24 July turbidity ranged from 7-27 NTU. After removal of the sheetpile at the end of the cofferdam and movement of conduit and barges, the down current turbidity ranged from 7-15 NTU. During the rest of the week's activities (moving the conduit, sinking the conduit, and pouring concrete near shore), the down current turbidity ranged from 4-14 NTU.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental each day is presented below. DO ranged from 2.6-12.3 mg/L during the week. Lowest DO was typically recorded in the morning, often at the background reference station prior to the start of construction. Values generally increased over the course of the day. The daily cycling of DO (lowest in the early morning, highest in the late afternoon) is not unexpected for this type of estuary and is not attributed to the construction activities.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
23 July	0645	5.5	74	23.7	22.4	DO ranged from 6.0-12.3 the remainder of the day. The minimum DO was recorded at the reference station and was the first reading of the day.
24 July	0715	5.0	67	24.2	20.8	DO ranged from 5.2-7.1 the remainder of the day. The minimum DO was recorded during the first transect of the day.
25 July						No monitoring performed – limited in water work
26 July						No monitoring performed – limited work because of heavy rainfall
27 July	0700	2.6	35	22.9	24.3	DO ranged from 3.6-6.6 the remainder of the day. The minimum was recorded during the first transect.
28 July	0630	3.2	43	23.6	20.8	DO ranged from 3.5-7.8 the remainder of the day. The minimum value was recorded at the reference station as the first sample of the day.

Water Quality/pH Monitoring – Modern Continental initiated pH monitoring on 27 July with the beginning of concrete pouring. pH values ranged from 7.0-7.1 at the opening to the cell, and the pH was 7.7 at 25 ft from where the cement was being poured. The pH values reported for Saturday 28 July appear to be in error (the reported values were extremely low, ranging from 5.7-6.8). Upon further investigation the following week, it was noted that instrument's pH probe was broken.

Corps (ENSR) Monitoring - Independent monitoring/sampling was initiated on Monday, 23 July but was discontinued because the scheduled work (dredging outside the sheetpile) was postponed. The Level 1 monitoring event was re-scheduled for the following day. On Tuesday 24 July, two monitoring events were completed (one on the flood tide and one on the ebb tide) during excavation outside the cofferdam, removal of the end sheetpile, and pulling of the conduit into the cofferdam.

The morning monitoring on 24 July during excavation outside the cofferdam and removal of the end sheetpile occurred during flood tide. Samples at the background reference station (FREF) and the 300-foot down current station (NBCE3) were collected for TSS/turbidity, PCBs, copper, lead, and chronic and acute toxicity testing. Background turbidity values ranged from 5-10 NTU. Turbidity 300 feet down current ranged from 0-51 NTU during excavation and then dropped to 3-10 NTU following completion of the excavation. During the afternoon ebb tide monitoring event, construction activities consisted of moving the conduit across the estuary and into the cofferdam. Samples at the background reference station (EREF), the 300-foot down current station (NBCE1), and the Coggeshall St. Bridge Station (NBCE2) were collected for TSS/turbidity, PCBs, copper, lead, and chronic and acute toxicity. Turbidity 300 feet down current of the construction ranged from 2-20 NTU. Background turbidity ranged from 4-6 NTU.

During the morning flood tide monitoring event, dissolved PCB (sum of the 18 NOAA congeners) concentrations were similar at the background and down current station. Total copper and lead concentrations were slightly higher at the down current station relative to background. During the ebb tide monitoring event, dissolved PCB concentrations were similar at the background and 300 foot down current station and were lower at the Coggeshall St. Bridge station. Total copper concentrations were higher at both down current stations relative to background. Total lead concentrations were higher at the 300 foot down current station relative to background.

The toxicity data for both monitoring events indicate no significant differences between background and down current stations for the acute tests (*Arbacia* fertilization, 48-hour *Champia*, and 48-hour mysid tests). The data also indicate no significant differences between background and down current stations for the 7-day mysid survival. For the chronic tests (7-day *Champia* cystocarp production and mysid weight), two differences were noted between background and down current stations. For the flood tide monitoring, the 7-day *Champia* cystocarp production at the down current station north of the construction (NBCE3) was reduced relative to the background station. Production at the down current station was 62% that of the background station. For the ebb tide monitoring, the 7-day mysid growth at the down current stations to the south of construction was reduced relative to the background station. Final mysid weights were 72% that of background for the 300 ft down current station (NBCE1) and 84% that of background for the Coggeshall St. Bridge station (NBCE2). Although no site-specific monitoring criteria were exceeded, these data indicate a limited construction impact, likely associated with the dredging outside the sheetpile enclosure. As this dredging was very short in duration (less than 2 hours) and was not scheduled to reoccur, no follow up monitoring was performed.

On Wednesday 25 July, ENSR compared turbidity readings of the Modern Continental meter against ENSR's meter as well as a set of standards. Both meters reported acceptable results.

Week of 30 July through 4 August

Construction Summary – On Monday 30 July, the conduit was submerged by placing large cylinders of concrete on the structure and filling the conduit with water. Additionally, the open eastern end of the cofferdam was closed on Monday afternoon. On Tuesday 31 July, preparations were undertaken to allow for placement of concrete over the conduit. On 1 August through 3 August (Wednesday-Friday), the conduit was armored with concrete. No work was performed on Saturday 4 August.

Com-Electric (Modern Continental) Monitoring – Monitoring was performed each day during the week. Turbidity measurements 300 feet down current of the construction ranged from 3-16 NTU. Background turbidity values ranged from 3-11 NTU.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental each day is presented below. Lowest values were recorded in the morning, typically at the background station prior to the start of construction. Values generally increased through the day, with some values well in excess of 100% saturation recorded in the afternoon.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
30 July	0700	5.6	74	23.2	21.2	Minimum value recorded at the down current station – DO increased to 11.1 mg/L later in the day.
31 July	0630	3.7	49	22.8	21.8	Minimum value was recorded at the reference station. Values increased to 10.6 mg/L by the end of the day.
1 Aug.	0745	5.8	79	23.9	23.6	Minimum value recorded during second transect of the day after tide switched from flood to ebb. DO increased to 12.3 mg/L later in the day.
2 Aug.	0815	5.5	76	24.8	23.8	Minimum values recorded during first transect of the day. DO increased to 11.4 mg/L by the end of the day.
3 Aug	0745	5.5	75	25.0	20.2	Minimum value recorded during second transect for the day. DO values increased to 9.3 mg/L by the end of the day.

Water Quality/pH Monitoring – pH values ranged from 5.6-5.7 on Monday 30 July. These values are assumed to be incorrect as they are extremely low, and the pH probe was discovered to be broken during inspection on 1 August. The probe was repaired and values ranged from 7.4-7.9 on 2 and 3 August. The meter was not calibrated for pH on these days (due to a lack of standard), but the values appear reasonable.

Corps (ENSR) Monitoring - ENSR performed oversight of Com-Electric monitoring on Wednesday, 1 August. ENSR's field meter was compared with Modern Continental's field meter throughout the day and values of pH and DO were comparable. However, the extremely high DO values measured by Modern Continental at the end of the day on 1 August were not confirmed by direct comparison.

ENSR completed independent turbidity monitoring on 2 August (Thursday) with the initiation of bulk concrete placement over the conduit. One TSS sample was collected inside the cofferdam near the location of the newly poured concrete (reported value = 100 mg/L). Turbidity ranged from 2-16 NTU down current of the construction activities. pH within the cofferdam was measured at 9.8. pH decreased to 8.3 at 50 feet down current of the sheetpile and to 7.8 at 300 feet down current.

Week of 6 Through 11 August

Construction Summary – Construction activities consisted of concrete placement over the conduit and surveying to determine the resulting thickness of concrete over the conduit. Based on the survey, it was determined that there were two areas that needed additional concrete to complete the armoring of the conduit. This additional concrete was poured on Saturday 11 August.

Com Electric (Modern Continental) Monitoring – Modern Continental performed monitoring on a 30 minute cycle during concrete placement and on a reduced frequency during support activities (setup and relocation of the concrete delivery pipe). Background turbidity values ranged from 2-24 NTU during the week with all but one value between 2-9 NTU. Turbidity measurements 300 feet down current of the construction ranged between 1 and 18 NTU during the week.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental each day is presented below. DO ranged from 2.4 to 14.1 mg/L during the week. Lowest DO was typically recorded in the morning, and values generally increased over the course of the day, with some values well in excess of 100% saturation recorded in the afternoon.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
6 Aug	0830	3.9	54	24.9	22.3	Minimum value recorded at down current station, after collection of reference (0700). DO increased to 12.3 later in the day.
7 Aug	0845	5.0	70	26.0	22.5	Minimum value recorded at down current station, second reading of the day. DO increased to 12.6 mg/L later in the day.
8 Aug	0745	4.2	60	26.3	23.7	Minimum value recorded at the down current station, second reading of the day. DO increased to 14.1 mg/L later in the day.
9 Aug	0730	4.5	64	26.5	23.6	Minimum value recorded at down current station, DO increased to 5.8 by 1030. Monitoring and construction activities ended at 1030.
10 Aug	0915	6.3	89	26.9	21.3	Minimum value recorded at down current station, DO increased to 10.9 mg/L later in the day. Monitoring and active construction activities ended at 1330. .
11 Aug	0715	2.4	34	26.2	22.8	Minimum DO recorded at reference station. DO increased to 4.7 by 0830. Monitoring and active construction activities ended at 1000.

Water Quality/pH Monitoring – pH values ranged from 7.1 to 8.3 at the 300 foot down current station over the course of the week and were comparable or slightly higher than background.

Corps (ENSR) Monitoring - Field oversight was performed on 06 August. No independent field monitoring was performed during the week.

Week Beginning 13 August Schedule

With completion of the concrete armoring, Modern Continental plans to begin removing the middle sheetpile wall and replacing sediment over the armored conduit. ENSR is scheduled to perform oversight as well as independent monitoring during the week.

Please contact Jay Mackay or Steve Wolf if you have questions or comments.

Jay Mackay – U.S. Army Corps of Engineers
(978) 318-8142; joseph.b.mackay@usace.army.mil

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

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Update 13 – 23 August 2001 - Water Quality Monitoring
New Bedford Harbor Superfund Site – Com Electric Conduit Crossing

Week of 13 Through 18 August

Construction Summary – Concrete pouring was completed on Saturday, 11 August allowing for backfilling to begin on Monday 13 August. Material was removed from the containment bay and placed in the conduit bay of the cofferdam throughout the week. On Wednesday, 15 August Modern Continental began to remove sheets from the middle wall (separating the containment and conduit bays of the cofferdam), and on Saturday, 18 August they began to drive sheets to extend the northern cofferdam wall to the east.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on a half-hour schedule during intensive work such as backfilling. Monitoring frequency was reduced during less intensive activities.

Background turbidity values ranged from 3-12 NTU during the week. Turbidity measurements 300 feet down current of the construction ranged between 1-17 NTU on Monday, 13 August through Thursday, 16 August. On both Friday and Saturday (17-18 August) Modern Continental was backfilling material inside the cofferdam. On both days a visual plume was noted extending from the eastern end of the cofferdam into the estuary, but turbidity measurements were well below the project criterion, with values ranging from 2-36 NTU 300 feet down current of construction.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental each day is presented below. DO ranged from 1.2-13.7 mg/L during the week. Lowest DO was typically recorded in the morning, often at the background reference station prior to the start of construction. Values generally increased over the course of the day. The daily cycling of DO (lowest in the early morning, highest in the late afternoon) is not unexpected for this type of estuary and is not attributed to the construction activities.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
13 Aug	0630	1.2	16	24.0	19.5	DO did not increase to >5.0 mg/L until 1300. Highest DO recorded was 8.9 at 1540.
14 Aug	0730	2.3	31	24.5	22.8	DO increasing to >5.0 mg/L by 1330. Highest DO recorded was 10.3 at 1530.
15 Aug	0740	2.3	31	22.8	22.7	DO increasing to >5.0mg/L by 1050.
16 Aug	0645	2.9	39	23.6	24.6	DO increased to >5.0 mg/L by 0915. Highest DO recorded was 13.7 at 1515.
17 Aug	0715	5.5	74	24.1	22.3	Highest DO recorded 8.6 mg/L at 1250.
18 Aug	0645	3.5	48	24.8	22.8	Highest DO recorded at 1245 (last reading of the day) was 10.4 mg/L.

Water Quality/pH Monitoring – pH values ranged from 6.8-7.9 throughout the week. On 14 August (Tuesday) the pH probe was determined to be broken, and was replaced on Wednesday.

Corps (ENSR) Monitoring – Oversight was performed on Tuesday, 14 August. Independent monitoring/sampling was performed on Friday, 17 August. Turbidity ranged from 4-17 NTU during the ebb tide monitoring period (0800-1154). A sample was collected from inside the conduit bay of the cofferdam while backfilling was occurring for acute toxicity testing, turbidity/TSS, total Cu and Pb, and

dissolved PCBs. A low-level plume was detected at 300 feet down current and was determined to be coming from the northeastern end of the cofferdam. A silt curtain was located at this position, but it appeared that water with suspended solids was exiting the cofferdam at the joint between the northern and eastern walls and then passing under the silt curtain. Turbidity up to 145 NTU was measured at this location, but was well below the criterion of 50 NTU above background at the 300-foot down-current station. However, as a precautionary measure, a composite sample was collected at the 300-foot down-current station as well as at an up current reference. These samples were archived pending the results from the sample collected inside the cofferdam.

Toxicity test results from the sample collected within the cofferdam returned 100% survival for all test organisms (*Arbacia punctulata*, *Champia parvula* and *Americamysis bahia*). Water chemistry results showed somewhat elevated total suspended solids, lead, and PCBs relative to typical down-current values. Total copper did not show a substantial elevation. Given these results for the sample collected *within* the cofferdam, the archived sample from the down-current station was not analyzed.

Week Beginning 20 August Schedule

Modern Continental is scheduled to complete backfilling operations and continue to remove the middle sheetpile wall. Additionally, sheets removed from the middle wall will be placed to the east of the existing cofferdam structure to extend each of the dam walls (northern, middle, and southern) approximately 150 feet to the east. At the end of the week Modern Continental may begin to remove a portion of the southern wall near the western edge. ENSR is scheduled to perform oversight as needed during the week.

Please contact Jay Mackay or Steve Wolf if you have questions or comments.

Jay Mackay – U.S. Army Corps of Engineers
(978) 318-8142; joseph.b.mackay@usace.army.mil

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

Update 14 – 04 September 2001 - Water Quality Monitoring
New Bedford Harbor Superfund Site – Com Electric Conduit Crossing

Week of 20 Through 25 August

Construction Summary – Modern Continental completed re-distribution of material within the cofferdam and grading over the conduit during the first half of the week. On Thursday, 23 August, the first of the sheetpile from the southern wall was removed, opening up the enclosed area to the Upper Harbor. The sheetpile was removed on the rising tide, allowing water from the Upper Harbor to flow into the enclosed cofferdam area. A larger barge was transported to the site to increase the on-water storage capacity for the sheetpile that was being removed.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on a half-hour to one-hour schedule during the week depending on the particular construction activity.

Background turbidity values ranged from 3-17 NTU during the week with most values below 10 NTU. Turbidity measurements 300 feet down current of the construction spiked to 71 NTU (with a background of 12 NTU) on Monday, 20 August. The elevated turbidity was attributed to support vessel operations attempting to move a barge during the lower stage of the tide. Work was stopped because of the turbidity excursion, and levels dropped below the 50 NTU above background criterion within an hour. During the remainder of the week, turbidity values 300 feet down current of operations were generally below 20 NTU and were often at background levels.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental each day is presented below. DO ranged from 2.7 to 11.1 mg/L during the week. Lowest DO was typically recorded in the morning, often at the background reference station prior to the start of construction. Values generally increased over the course of the day. The daily cycling of DO (lowest in the early morning, highest in the late afternoon) is not unexpected for this type of estuary and is not attributed to the construction activities.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
20 Aug	0815	3.2	43	24.7	19.3	DO increased to > 5 mg/L after 1000. Maximum DO recorded was 7.5 mg/L at 1600.
21 Aug	0800	2.9	39	25.0	19.8	DO increased to > 5 mg/L after 0930. Maximum DO recorded was 9.1 mg/L at 1400.
22 Aug	0800	2.7	37	25.3	21.5	DO increased to > 5 mg/L after 0900. Maximum DO recorded was 11.1 mg/L at 1500.
23 Aug	0730	4.1	56	24.5	22.0	DO increased to > 5 mg/L after 1000. Maximum DO recorded was 10.5 mg/L at 1300.
24 Aug	0645	4.5	61	24.1	22.2	DO increased to > 5 mg/L after 0930. Maximum DO recorded was 9.2 mg/L at 1400.
25 Aug	0745	5.0	67	23.2	23.5	DO above 5 mg/L for all monitoring period. Maximum DO recorded was 9.5 mg/L at 1045.

Water Quality/pH Monitoring – pH monitoring has been discontinued until the next phase of concrete pouring.

Corps (ENSR) Monitoring – ENSR provided oversight of the Modern Continental monitoring on 20 and 23 August. On 23 August, a water sample was collected from within the cofferdam prior to removal of the southern sheetpile wall (opening up the sheetpiled enclosure to the Upper Harbor).

Toxicity test results from the sample collected within the cofferdam returned 100% survival for all test organisms (*Arbacia punctulata*, *Champia parvula* and *Americamysis bahia*) relative to laboratory controls. Water chemistry results showed somewhat elevated total suspended solids (190 mg/L), copper (13.9 ug/L), lead (35.1 ug/L), and PCBs (2.2 ug/L, as sum of 18 NOAA congeners – dissolved phase) relative to previous measurements. Given the lack of toxicity and the dilution of water within the cofferdam prior to discharge, no significant environmental impacts were anticipated with the opening of the cofferdam.

Week of 27 Through 31 August

Construction Summary – On Monday, 27 August, Modern Continental removed the first of the northern sheetpile wall, opening up the western end of construction area to north-south tidal currents. Sheetpile removal continued throughout the week as well as driving of sheetpile on the eastern side of the Upper Harbor. As of Friday, 31 August, approximately 80% of the Phase 1 sheetpile had been removed, and approximately 40% of the Phase 2 sheetpile had been driven into place.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on a half-hour to two-hour schedule during the week depending on the particular construction activity.

Background turbidity values ranged from 2-15 NTU during the week with most values below 10 NTU. The maximum turbidity value recorded at 300 feet down current of the construction was 45 NTU with most values below 20 NTU. There were no exceedences of the turbidity criterion during the week.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental each day is presented below. DO ranged from 2.0 to 8.8 mg/L during the week.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
27 Aug	0730	3.6	46	22.3	18.0	DO increased to > 5 mg/L after 0900. Maximum DO recorded was 8.8 mg/L at 1645.
28 Aug	1100	2.7	37	24.6	21.4	DO increased to > 5 mg/L after 1400. Maximum DO recorded was 7.2 mg/L at 1600.
29 Aug	0630	3.2	43	24.3	20.7	DO increased to > 5 mg/L after 1100. Maximum DO recorded was 8.1 mg/L at 1445.
30 Aug	1100	2.0	28	25.6	22.3	DO increased to > 5 mg/L after 1130. Maximum DO recorded was 6.9 mg/L at 1230.
31 Aug	0745	3.5	48	24.0	23.5	DO increased to 5.1 at the end of the monitoring at 1330.

Corps (ENSR) Monitoring – ENSR performed parallel turbidity monitoring on 27 and 28 August during removal of the northern sheetpile wall with the potential to escalate to Level 1 monitoring in the event of significant turbidity elevations. However, turbidity measurements were similar to those recorded by Modern Continental. Since a significant turbidity plume associated with the operation was not detected, sampling for laboratory analysis/toxicity testing was not performed. ENSR met with Modern Continental on Friday, 31 August to review the schedule for upcoming Phase 2 work.

Week Beginning 04 September Schedule

Modern Continental is scheduled to continue pulling the Phase 1 sheetpile and driving Phase 2 sheetpile on the eastern side of the Upper Harbor throughout the week. Modern Continental will continue daily monitoring throughout the week. ENSR is scheduled to perform oversight one day during the week.

Please contact Jay Mackay or Steve Wolf if you have questions or comments.

Jay Mackay – U.S. Army Corps of Engineers
(978) 318-8142; joseph.b.mackay@usace.army.mil

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

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Revised Update 15 – 05 September 2001 - Water Quality Monitoring
New Bedford Harbor Superfund Site – Com Electric Conduit Crossing

This update provides an overview of the results of Phase 1 monitoring and presents a proposed monitoring schedule for Phase 2 of the project.

Summary of Phase 1 Water Quality Monitoring

Phase 1 construction activities in New Bedford's Upper Harbor as part of the Commonwealth Electric cable installation project began on 26 March 2001 with sheet pile driving on the west (New Bedford) bank of the Upper Harbor. Phase 1 construction, as defined for the purposes of this project, included all construction and related activities required to complete the installation of the new cable conduit bundle from the NSTAR cable trunk manhole on the western shore to the approximate centerline of the Upper Harbor. The major activities, in the order in which they were completed, included:

- Sheet pile driving to construct the cofferdams;
- Cable trench excavation;
- Grading the cable trench with stone;
- Installing the cable conduit;
- Setting the concrete cap over the cable conduit;
- Replacing the original excavated materials over the cable trench; and
- Removing the sheet pile walls of the cofferdam.

Two complimentary water quality monitoring programs were conducted during field construction activities. A daily turbidity/dissolved oxygen monitoring program supplemented with sampling for TSS analysis was performed by the construction contractor, Modern Continental (first by a subcontractor, OHI, and then by Modern Continental directly). ENSR provided periodic oversight of the OHI/Modern Continental effort as well as periodic independent turbidity monitoring and comprehensive sampling for toxicity testing and chemical analyses.

The monitoring program performed by Modern Continental required turbidity monitoring ranging in frequency from one-half to two hours (dependent on construction activities) along designated down current transects in the estuary during periods of active construction. Additionally, three samples for TSS analysis were required during each monitoring day as a backup to the turbidity monitoring. Real-time monitoring of dissolved oxygen was also performed in conjunction with the turbidity monitoring at a two-hour frequency at a limited number of down current and background stations.

Down current turbidity monitoring results indicated that sheet pile driving was generally an innocuous construction activity, with elevated turbidity limited to a small and localized area near the bottom. A similar turbidity signature was also identified for stone placement. Somewhat higher turbidity values were recorded during excavation and sheet pile removal. Over the five months of Phase 1 operations, there were only three documented exceedences of the project specified turbidity criterion (50 NTU above background at a point 300 feet down current of construction operations).

- 20 April – ENSR monitoring recorded spikes of elevated turbidity (approximately 90 NTU above background at the compliance point) attributed to repositioning of a barge at a lower stage of the tide. The elevated turbidity was very limited in duration.
- 18 June – Modern Continental monitoring recorded a well-defined turbidity plume (approximately 55 NTU above background at the compliance point) originating from a small gap in the sheet pile wall during trench excavation. Excavation was halted,

and a silt curtain was installed around the gap which limited further turbidity excursions to acceptable levels.

- 20 August – Modern Continental monitoring recorded a limited spike of elevated turbidity (approximately 60 NTU above background at the compliance point) attributed to repositioning of a barge at a lower stage of the tide. The elevated turbidity was limited in duration.

Monitoring of dissolved oxygen has identified variations in levels (both seasonal and daily) typical for this type of estuary with no apparent impact from the construction activities.

Additional monitoring of water column pH was instituted during the portion of Phase 1 where the presence of concrete could possibly affect water quality. This facet of monitoring was conducted from the days just prior to concrete application until the water sequestered by the cofferdam was ultimately released to the estuary at the time of sheet pile removal. No discernable impacts to pH were detected at the down current compliance point.

ENSR monitoring was executed in accordance with the approved plan. Physical samples were collected for the analysis of TSS, dissolved PCB's, and total Cu and Pb, and for toxicity testing. These samples were collected at designated points in the construction sequence to capture samples representative of each of the discrete construction activities of Phase 1. Additional unscheduled grab samples were also collected to capture worst case scenarios i.e., from directly within the cofferdam or at the origin of observable turbidity plumes. A total of 18 sampling events were completed during Phase 1 including nine ebb tide events, three flood tide events, and six grab samples. The following table presents mean values for the ebb and flood tide monitoring:

Parameter	EBB – Background/ Reference (mean value)	EBB – 300 ft Down Current (mean value)	FLOOD – Background/ Reference (mean value)	FLOOD – 300 ft Down Current (mean value)
TSS	14.6 mg/L	18.0 mg/L	20.3 mg/L	28.3 mg/L
Dissolved PCB's (sum of 18 NOAA congeners)	0.54 ug/L	0.85 ug/L	0.64 ug/L	0.81 ug/L
Total Pb	3.4 ug/L	7.2 ug/L	4.1 ug/L	6.5 ug/L
Total Cu	4.7 ug/L	8.2 ug/L	6.1 ug/L	9.1 ug/L

As noted in the above table, concentrations of all parameters were somewhat elevated at the 300 foot down current monitoring station. For the further down current ebb tide station location at the Coggeshall St. Bridge, concentrations of all parameters were at or below the background concentrations. Toxicity testing (performed with *Arbacia punctulata*, *Champia parvula*, and *Americamysis bahia*) revealed no acute impacts relative to background for any of down current stations. In addition, no acute impacts were reported for any of the grab samples collected directly within the cofferdam or at the origin of turbidity plumes.

Although no project-specific monitoring criteria were set for chronic toxicity testing, the testing was performed on some samples as a more sensitive indicator. The testing revealed only one instance of a potential chronic impact. For samples collected on 24 July, the 7-day *Champia* cystocarp production and the 7-day mysid growth were somewhat reduced at the 300 foot down current station relative to background. These data indicate a limited construction impact, likely associated with the dredging outside the sheetpile enclosure that occurred on this date. As this dredging was very short in duration (less than 2 hours) and was not scheduled to reoccur, no significant impacts were expected.

Proposed Phase 2 Monitoring

Given the limited water quality impacts associated with Phase 1 of the project and the more favorable sediment conditions (coarser grained material with lower contamination levels) expected for Phase 2 operations on the eastern side of the Upper Harbor, the following monitoring program is proposed:

Construction Phase	Modern Continental Monitoring	ENSR Monitoring
Driving sheetpile	Turbidity monitoring at two hour frequency	Oversight
Excavating conduit trench	Turbidity monitoring at one-half hour frequency for the first day – reduced to two-hour frequency on following days if no exceedences	Oversight and one day of monitoring and sample collection with acute toxicity testing and archived chemistry samples
Grading trench with stone	Turbidity monitoring at two hour frequency	Oversight
Pulling conduit and connecting at center (requires removal of end sheetpile)	Turbidity monitoring at one-half hour frequency for the first day – reduced to two-hour frequency on following days if no exceedences	Oversight and one day of monitoring and sample collection with acute toxicity testing and archived chemistry samples
Setting the concrete cap	Turbidity and pH monitoring at one-half hour frequency for the first day – reduced to two-hour frequency on following days if no exceedences	Oversight
Replacing excavated material, grading, and removing center sheetpile	Turbidity monitoring at one-half hour frequency for the first day – reduced to two-hour frequency on following days if no exceedences	Oversight and one day of monitoring and sample collection with acute toxicity testing and archived chemistry samples
Removing outer sheetpile	Turbidity monitoring at one-half hour frequency for the first day – reduced to two-hour frequency on following days if no exceedences	Oversight, collection of sample from within the enclosed area prior to removal of the outer sheetpile wall for acute toxicity testing and chemistry, parallel turbidity monitoring

Notes:

- 1) Regular sampling for TSS analysis is discontinued. All exceedences of the turbidity criterion require collection of duplicate samples for TSS analysis at the location of the exceedence.
- 2) Monitoring of dissolved oxygen should continue unchanged from the Phase 1 program (two-hour cycle at a background and down current stations).
- 3) Movement of barges within a two hour window around high tide (± 1 hour of the predicted high tide) requires one set of transect turbidity measurements – first at 100 feet down current to determine if sediment is being disturbed and conditionally at 300 feet down current to determine compliance. Movement of barges within other stages of the tide require continuous monitoring of transect turbidity during the entire period of barge movement – first at 100 feet down current to determine if sediment is being disturbed and conditionally at 300 feet down current to determine compliance. The goal is to identify turbidity excursions and modify operations prior to exceedence of the turbidity criterion.

Please contact Jay Mackay or Steve Wolf if you have questions or comments.

Jay Mackay – U.S. Army Corps of Engineers
(978) 318-8142; joseph.b.mackay@usace.army.mil

Steve Wolf – ENSR International
(978) 589-3187; swolf@ensr.com



Update 16 – 04 October 2001 - Water Quality Monitoring
New Bedford Harbor Superfund Site – Com Electric Conduit Crossing

Week of 4 Through 8 September

Construction Summary – Modern Continental continued to pull sheets from the western side of the estuary (Phase I) and drive sheets on the eastern side (Phase II).

Com Electric (Modern Continental) Monitoring – Monitoring was performed on a two hour schedule during the week. Background (reference) turbidity values ranged from 5-17 NTU. Turbidity measurements at transects 300 ft down current of construction ranged from 3-26 NTU. There were no exceedences of the turbidity criterion during the week.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental each day is presented below. DO ranged from 4.8-11.4 mg/L during the week. Lowest DO was typically recorded in the morning. Values generally increased over the course of the day. The daily cycling of DO (lowest in the early morning, highest in the late afternoon) is not unexpected for this type of estuary and is not attributed to the construction activities. The DO values for the estuary have generally increased recently due to the decrease in estuary water temperatures allowing for greater saturation values.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
4 Sept	0715	4.9	65	22.3	24.5	Maximum DO was 9.4 mg/L at 1315. DO increased to > 5.0 mg/L after 0900.
5 Sept	0715	4.8	63	22.4	23.4	Maximum DO was 9.5 mg/L at 1415. DO increased to > 5.0 mg/L after 0900
6 Sept	0700	5.1	66	21.0	24.8	Maximum DO was 11.3 mg/L at 1400.
7 Sept	0700	6.2	80	21.3	23.3	Maximum DO was 11.4 mg/L at 1530.
8 Sept	0700	5.2	68	21.7	23.8	Maximum DO was 9.1 mg/L at 1230.

Water Quality/pH Monitoring – pH monitoring has been discontinued until the next phase of concrete pouring.

Corps (ENSR) Monitoring – ENSR reviewed the daily monitoring sheets and communicated with construction personnel but did not conduct any field monitoring/oversight activities during this week.

Week of 10 Through 15 September

Construction Summary – Modern Continental continued to pull sheets from the western side of the estuary (Phase I) and drive sheets on the eastern (Phase II) side.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on a hour and a half to two-hour schedule during the week

Background (reference) turbidity values ranged from 7-15 NTU during the week. Turbidity measurements at transects 300 ft down current of construction ranged from 7-27 NTU during the week. There were no exceedences of the turbidity criterion during the week.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental each day is presented below. DO ranged from 3.7-12.1 mg/L during the week.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
10 Sept	0700	3.7	49	23.1	20.2	DO increased to > 5 mg/L after 0800. Maximum DO recorded was 10.5 mg/L at 1400.
11 Sept	0625	5.0	67	23.7	22.9	Maximum DO recorded was 12.1 mg/L at 1515.
12 Sept	0630	4.1	54	21.5	24.6	DO increased to > 5 mg/L after 0700. Maximum DO recorded was 9.4 mg/L at 1430.
13 Sept	0630	5.4	71	21.4	24.8	Maximum DO recorded was 9.7 mg/L at 1500.
14 Sept	0849	4.9	64	21.6	25.0	Maximum DO recorded was 5.6 mg/L at 1049 and 1445.
15 Sept	0605	5.5	68	18.3	24.8	Maximum DO recorded was 6.0 mg/L at 1300.

Corps (ENSR) Monitoring – ENSR performed oversight on 14 September. It was noted that the low DO values Modern Continental recorded throughout the day on 14 September (not showing the typical rise in the afternoon) could be due to the state of the meter's sensor as there was a KCl deposit covering half of the inside of the membrane.

Week of 17 Through 22 September

Construction Summary – Modern Continental continued to drive sheets on the eastern edge of the estuary (Phase II). On Tuesday 18 September about a third of the cofferdam was closed using sheet pile. Excavation inside the contained area was initiated and continued until Friday. On Saturday, the remaining sheet and I beams from Phase I were removed.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on a half hour basis during the first day and a half of excavation (Tuesday afternoon and Wednesday morning) after which sampling was reduced to a 2 hour schedule.

Background (reference) turbidity values ranged from 3-16 NTU during the week. On 20 September, the reference taken at 0630 was 29 NTU; this value then dropped to 3 NTU by 0915. Turbidity measurements at transects 300 ft down current of construction ranged from 4-34 NTU during the week. There were no exceedences of the turbidity criterion during the week.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental each day is presented below. DO ranged from 4.2-7.9 mg/L during the week.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
17 Sept	0845	4.5	56	18.9	24.2	DO increased to > 5 mg/L after 0900. Maximum DO recorded was 6.8 mg/L at 1145. (On the water work ended at 1130.)
18 Sept	0745	4.6	58	19.5	25.9	DO increased to > 5 mg/L after 1000. Maximum DO recorded was 7.7 mg/L at 1330.
19 Sept	0750	5.1	66	20.5	26.0	Maximum DO recorded was 7.9 mg/L at 1300.
20 Sept	0915	6.0	77	20.9	22.7	Maximum DO recorded was 7.7 mg/L at 1100.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
21 Sept	0700	4.7	60	20.3	25.1	DO increased to > 5 mg/L after 0900. Maximum DO recorded was 5.8 mg/L at 1330.
22 Sept	0900	4.2	52	20.5	18.4	DO increased to > 5 mg/L after 1300. Maximum DO recorded was 6.8 mg/L at 1330.

Corps (ENSR) Monitoring – ENSR performed oversight on 18 September. ENSR and Modern's field meters were compared and showed relatively good agreement. Excavation was halted on this day due to a flood tide overtopping about 200 ft of the southern sheet pile wall. Excavation was initiated again once the water had receded below the sheetpile.

Independent monitoring was performed on 20 September. During this ebb tide Modern continued to excavate inside the cofferdam. Turbidity ranged from 4-15 NTU 300 ft down current and at the Coggeshall St. Bridge station. Samples were collected at the background and two down current stations. Chemistry samples were archived and acute toxicity samples were analyzed. Toxicity test results (*Arbacia punctulata*, *Champia parvula*, and *Americamysis bahia*) showed no significant difference in survival between reference (background) and down current stations.

Week of 24 Through 29 September

Construction Summary – Modern continued to excavate in the northern cell and drive sheets on the phase II side of the project. Activities also included grading of the cell, straightening of the sheets in the southern wall, and initiation of conduit assemblage.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on a 2 hour schedule.

Background turbidity values ranged from 4-14 NTU during the week. Turbidity measured at transects 300 ft down current of construction ranged from 3-17 NTU. There were no exceedences of the turbidity criterion during the week.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental each day is presented below. DO ranged from 3.4-14.7 mg/L during the week.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
24 Sept	0615	4.6	59	21.9	19.8	DO increased to > 5.0 mg/L by 0745. Maximum DO was 14.7 mg/L at 1515.
25 Sept	0915	6.6	84	21.9	18.6	Maximum DO was 9.4 mg/L at 1515.
26 Sept	0715	3.4	44	21.8	20.3	DO > 5.0 mg/L by 0730. Maximum DO was 14.3 mg/L at 1700.
27 Sept	0745	4.5	59	21.5	24.4	DO > 5.0 mg/L by 1115. Maximum DO was 12.8 mg/L at 1530.
28 Sept	0730	4.9	62	20.9	22.1	Maximum DO was 8.7 mg/L at 1230.
29 Sept						Report not available.

Corps (ENSR) Monitoring –ENSR performed oversight on 26 September. ENSR and Modern's field meters were compared and showed relatively good agreement. No independent monitoring was performed this week.

Week Beginning 01 October Schedule

Modern Continental is scheduled to continue driving sheets for the Phase II cofferdam and continue excavation inside the cofferdam. Modern Continental will continue daily monitoring throughout the week. ENSR is scheduled to perform oversight one day during the week.

Please contact Jay Mackay or Steve Wolf if you have questions or comments.

Jay Mackay – U.S. Army Corps of Engineers
(978) 318-8142; joseph.b.mackay@usace.army.mil

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

Update 17 – 05 November 2001 - Water Quality Monitoring
New Bedford Harbor Superfund Site – Com Electric Conduit Crossing

Week of 01 Through 06 October

Construction Summary – Modern Continental continued to drive sheets and excavate inside the cofferdam on the eastern side of the estuary (Phase II). Sheets remaining from Phase I on the shore of the western side of the estuary were removed. A trench was excavated on land on the New Bedford side to allow routing of the conduit into a manhole.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on a two-hour schedule during the week. Background (reference) turbidity values ranged from 2-13 NTU. Turbidity measurements at transects 300 ft down current of construction ranged from 2-24 NTU. There were no exceedences of the turbidity criterion during the week.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental each day is presented below. DO ranged from 6.3-13.2 mg/L during the week. Lowest DO was typically recorded in the morning. Values generally increased over the course of the day. The daily cycling of DO (lowest in the early morning, highest in the late afternoon) is not unexpected for this type of estuary and is not attributed to the construction activities. The DO values for the estuary have generally increased recently due to the decrease in estuary water temperatures allowing for greater saturation values.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
1 Oct	1130	7.0	80	15.1	23.2	Maximum DO was 7.7 mg/L after 1300.
2 Oct	0730	6.5	74	15.1	23.1	Maximum DO was 10.1 mg/L at 1500.
3 Oct	0700	6.3	75	16.5	24.5	Maximum DO was 10.2 mg/L at 1545.
4 Oct	0700	6.7	82	17.8	24.3	Maximum DO was 12.5 mg/L at 1630.
5 Oct	0715	7.0	86	18.8	23.3	Maximum DO was 13.2 mg/L at 1330.
6 Oct	0700	7.1	89	18.9	24.7	Due to high winds, transects only taken up to 0915, DO was 7.5 mg/L at 0915.

Water Quality/pH Monitoring – pH monitoring has been discontinued until the next phase of concrete pouring.

Corps (ENSR) Monitoring – ENSR performed oversight on 3 October. It was noted that at high tide two sections of sheet in the southern wall were overtopped. Substantial turbidity (up to 68 NTU near the source) was noted coming from the terminus of the western end of the northern and middle wall. The turbidity dropped to 11-19 NTU down current from this area. After the tide dropped more than half way, the sediment covering the Phase I side of the concrete cap effectively blocked the outflow of turbidity from this location.

Week of 08 Through 14 October

Construction Summary – Monday 9 October was the Columbus Day Holiday, and no work was performed on site. Modern Continental continued to work on the conduit placement on the western (Phase I) side of the estuary. Surveying, grading and excavation as necessary were completed on the eastern side of the estuary (Phase II) to prepare for placing the conduit into the cofferdam. Additional sheets were driven on the eastern side of the estuary (Phase II).

Com Electric (Modern Continental) Monitoring – Monitoring was generally performed on a two-hour schedule during the week. Monitoring was performed with reduced frequency during periods when work

was restricted to within the cofferdam (not excavation work). Background (reference) turbidity values ranged from 5-12 NTU during the week. Turbidity measurements at transects 300 ft down current of construction ranged from 2-16 NTU during the week. There were no exceedances of the turbidity criterion during the week.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental each day is presented below. DO ranged from 8.2-12.9 mg/L during the week.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
08 Oct						No work on-site. Columbus Day
09 Oct	0730	8.2	87	12.6	19.5	Maximum DO was 12.9 mg/L at 1400.
10 Oct	0745	8.5	94	13.0	24.0	Maximum DO was 12.3 mg/L at 1455.
11 Oct	0700	9.4	107	14.4	23.7	Maximum DO was 12.6 mg/L at 1600.
12 Oct	0700	8.6	101	16.0	24.0	Maximum DO was 10.3 at 1100 (final transect for the day)
13 Oct	0730	8.4	97	15.2	24.6	Maximum DO was 10.3 mg/L at 1345.

Corps (ENSR) Monitoring – ENSR performed a partial day of oversight on 11 October. No independent monitoring was performed.

Week of 15 through 19 October

Construction Summary – No on the water work was performed on Monday 15 October. The remainder of the week was spent preparing the conduit assembly on the Phase II side of the estuary, pulling sheets (Phase I) and miscellaneous tasks on both Phase I and II sides of the river. No work was completed on Saturday 20 October.

Com-Electric (Modern Continental) Monitoring - Monitoring was generally performed on a two-hour schedule during the week and with reduced frequency when work was restricted within the cofferdam. Background (reference) turbidity values during the week ranged from 3-12 NTU. Turbidity measurements at transects 300 ft down current of construction ranged from 1-13 NTU. There were no exceedances of the turbidity criterion during the week.

Dissolved Oxygen/Water Quality A summary of the minimum DO measured by Modern Continental each day is presented below. DO ranged from 6.5-7.9 mg/L during the week.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
15 Oct						No on the water work.
16 Oct	0700	7.3	85	15.7	24.0	Only other reading taken at 0730.

17 Oct	1030	7.3	84	15.4	23.7	Maximum DO was 7.9 mg/L at 1430. Sampling did not begin until 1000.
18 Oct	0800	6.9	78	13.6	26.4	Maximum DO was 7.7 mg/L at 1400.
19 Oct	0815	6.5	74	12.9	30.3	Maximum DO was 7.9 mg/L at 1400.
20 Oct						No work on site

Corps (ENSR) Monitoring – ENSR performed oversight on 19 October. No independent monitoring was performed.

Week of 22 through 27 October

Construction Summary – 22 October (Monday) was spent washing I beams on the Phase I side of the estuary and preparing the conduit for movement into the cofferdam. On 22 October, an attempt was made to move the conduit into the cofferdam, but due to operational difficulties conduit movement was postponed. The first half of the conduit was moved into the cofferdam on Wednesday 24 October. Excavation on land on the Acushnet side of the estuary was begun on 25 October and continued through 26 October. No on the water work was completed on 27 October.

Details of the movement of the conduit into the cofferdam

The method by which the conduit was moved into the cofferdam was different than that performed in Phase I. Instead of opening the estuary end of the cofferdam and pulling the conduit through (as in Phase I), the conduit was pulled in from land. The conduit was lifted off the ground using several excavators and cranes. The estuary terminus (western end of the Phase II section) was supported on a section of flexi-float at the landward end of the cofferdam and was attached to a crane located at the western end of the cofferdam. Tension was applied to the cable as the equipment on land lifted the conduit off the ground. The conduit was pulled over the flexifloat and into the estuary within the cofferdam. The estuary terminus (western end) of the conduit was secured on a flexi-float so that it can be spliced to the Phase I side of the conduit. It should be noted that the western end wall of the cofferdam did not need to be opened for movement or splicing of the Phase II conduit as the Phase I conduit terminus is already located within the cofferdam. The western end wall of the cofferdam is constructed of large sheet-metal pieces laid north-to-south, blocking the end of the cofferdam. These sheet-metal pieces were not driven into the sediment. Rather, they were attached to the cofferdam walls and rest on the concrete cap, allowing the Phase I conduit to pass underneath into the cofferdam.

Com-Electric (Modern Continental) Monitoring - Monitoring frequency was limited during the week as much of the work was performed within the cofferdam. Background (reference) turbidity values ranged from 2-8 NTU. Turbidity measurements at transects 300 ft down current of construction ranged from 1-8 NTU. There were no exceedences of the turbidity criterion during the week.

Dissolved Oxygen/Water Quality A summary of the minimum DO measured by Modern Continental each day is presented below. DO ranged from 4.9-8.5 mg/L during the week.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
22 Oct	0745	7.0	81	14.8	26.2	DO increased to 8.5 mg/L by 1335.
23						No monitoring performed

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
Oct 24						No monitoring performed
25 Oct	1445	7.0	86	18.1	24.3	Transects only performed from 1230 to 1445.
26 Oct	0730	4.9	60	17.3	25.9	Transects only performed from 0730 to 0945.
27 Oct						No monitoring performed

Corps (ENSR) Monitoring – ENSR preformed oversight on 22 October. No independent monitoring was performed.

Week of 29 October Through 03 November

Construction Summary – Construction during the week included onshore work on both sides of the estuary as well as splicing of the Phase I and II sections of conduit.

Com-Electric (Modern Continental) Monitoring – No monitoring was performed during the week as construction activities were limited to onshore areas or low-impact work within the cofferdam. It was noted that the waters of the estuary were quite clear during the week.

Dissolved Oxygen/Water Quality – No measurements performed.

Corps (ENSR) Monitoring – ENSR preformed a partial day of oversight on 2 November. No independent monitoring was completed.

Week Beginning 05 November

Modern Continental will continue onshore work on both sides of the estuary along with splicing of the conduit. As such, no monitoring is anticipated. ENSR is scheduled to perform a partial day of oversight during the week. In-water work is expected to resume the week of 12 November with placement of the concrete cap over the Phase II portion of the conduit, and water quality monitoring is expected to resume at that time. ENSR is scheduled to perform additional oversight as well as parallel turbidity/pH measurements at that time.

Please contact Jay Mackay or Steve Wolf if you have questions or comments.

Jay Mackay – U.S. Army Corps of Engineers
(978) 318-8142; joseph.b.mackay@usace.army.mil

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

Update 18 – 19 November 2001 - Water Quality Monitoring
New Bedford Harbor Superfund Site – Com Electric Conduit Crossing

Week of 05 Through 10 November

Construction Summary – Modern Continental completed miscellaneous tasks on the New Bedford (Phase I) side of the estuary associated with routing of the conduit into the manhole. On the Acushnet (Phase II) side of the estuary, Modern continued to excavate and grade the cell. Work on the Phase II side was generally confined to the area bordered by salt marsh. Several sheets were repositioned along the southern wall where the trench wall had begun to buckle. Modern removed the steel conduit attached to the conduit bundle to allow for easier movement of the conduit. Therefore, the steel conduit must be added back to the structure and spliced together before addition of the concrete cap can occur.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on a two-hour schedule Tuesday through Friday during the week. Background (reference) turbidity values ranged from 0-2 NTU. Turbidity measurements at transects 300 ft down current of construction ranged from 0-3 NTU. There were no exceedences of the turbidity criterion during the week.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental each day is presented below. DO ranged from 7.8-9.4 mg/L during the week. DO values for the estuary have increased due to decreasing water temperatures throughout the estuary. At this point in the year, the daily DO cycling seen during the summer is minimal, due to decreasing light levels and a decrease in associated biological processes. The possibility of an anoxic event at this time of year is slight.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
6 Nov	0730	8.2	88	10.9	26.5	Maximum DO was 8.7 mg/L at 1145.
7 Nov	0730	7.8	84	10.1	30.4	Maximum DO was 8.7 mg/L at 1245.
8 Nov	0745	8.0	84	9.0	29.6	Maximum DO was 9.4 mg/L at 1345.
9 Nov	0745	8.7	94	10.3	29.9	Maximum DO was 9.2 mg/L after 1445.

Water Quality/pH Monitoring – pH monitoring has been discontinued until the next phase of concrete pouring.

Corps (ENSR) Monitoring – ENSR performed one partial day of oversight on 08 November. No independent monitoring was performed.

Week of 12 Through 17 November

Construction Summary – Monday 12 November was the Veterans Day Holiday, and no work was performed on site. Modern Continental continued to work on splicing the conduit on the New Bedford (Phase I) side of the estuary. The final section of conduit was pulled into the cofferdam on the Acushnet side (Phase I) on Wednesday 14 November. No on the water work was completed on Saturday 17 November.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on a two-hour schedule on 14 November and 16 November. Monitoring was not performed while work was confined to the upland salt marsh area or completely onshore. Background (reference) turbidity values ranged from 0-13

NTU on 14 and 16 November. Turbidity measurements at transects 300 ft down current of construction ranged from 0-12 NTU. There were no exceedances of the turbidity criterion during monitoring.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental is presented below. DO ranged from 7.8-10.9 mg/L on 14 and 16 November.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
12 Nov	0700	10.1	106	8.5	31.2	Monitoring only preformed from 0700 until 1115.
16 Nov	1145	7.8	85	10.7	29.7	

Corps (ENSR) Monitoring – ENSR performed one partial day of oversight on 15 November. No independent monitoring was performed.

Week Beginning 19 November

Modern Continental will continue onshore work on both sides of the estuary along with splicing of the conduit, and placement of the steel conduit in the cofferdam on the Acushnet (Phase I) side of the estuary. Modern may begin to pour the concrete concrete cap on Friday 23 November if all the conduit has been spliced. No monitoring is anticipated earlier in the week. If concrete is poured during the week Modern will begin to monitor pH as well as the general suite of parameters. ENSR is scheduled to perform a partial day of oversight during the week.

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Jay Mackay – U.S. Army Corps of Engineers
(978) 318-8142; joseph.b.mackay@usace.army.mil

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

Update 19 – 10 February 2002 - Water Quality Monitoring
New Bedford Harbor Superfund Site – Com Electric Conduit Crossing

Week of 19 Through 24 November

Construction Summary – Modern Continental completed miscellaneous tasks on the New Bedford (Phase I) side of the estuary. On the Acushnet (Phase II) side of the estuary, Modern began to place ballast on the conduit to sink the bundle, allowing for concrete placement. No work was completed on 22 November due to the Thanksgiving holiday.

Com Electric (Modern Continental) Monitoring – Monitoring was not performed during this week. No activities that could cause potential environmental concern were performed during this period.

Dissolved Oxygen/Water Quality – See above.

Water Quality/pH Monitoring – pH monitoring has been discontinued until the next phase of concrete placement.

Corps (ENSR) Monitoring – ENSR performed one partial day of oversight on 21 November. No independent monitoring was performed.

Week of 26 Through 01 December

Construction Summary – Modern continued to work on sinking the conduit by placing ballast on the conduit bundle. Beginning on Saturday, 01 December and continuing on Monday, 03 December, Modern moved the material that had accumulated at the estuary end of the cofferdam between the ends of the conduit. This silty material was removed by pumping it into a holding container on a nearby barge, and then pumping the material from the holding container into the holding cell. Monitoring was performed during this operation.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on an approximately half-hour schedule on 01 December during the pumping operation to remove material between the conduit. Background (reference) turbidity values ranged from 2-9 NTU. Turbidity measurements at a transect 300 ft down current of construction ranged from 1-5 NTU before material removal began and from 3-17 NTU during material removal. There were no exceedances of the turbidity criterion during monitoring.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental is presented below. DO ranged from 7.7-8.9 mg/L on 01 December.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
01 Dec	1100	7.7	84.7	13.1	23.4	

Water Quality/pH Monitoring – pH monitoring has been discontinued until the next phase of concrete placement.

Corps (ENSR) Monitoring – ENSR performed one partial day of oversight on 28 November. No independent monitoring was performed.

Week of 03 Through 08 December

Construction Summary – Modern continued to work on sinking the conduit by placing ballast on the conduit bundle. On 03 December, Modern finished removing the material located between the conduit and began to install the tremie line to be used in placing concrete. Final preparations on the conduit were completed on 08 December.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on an approximately half-hour schedule during the material removal pumping that occurred on 03 December. A half-day of monitoring was performed on Tuesday 04 December on a 2-hour schedule. Background (reference) turbidity values ranged from 0-2 NTU. Turbidity measurements at the transect 300 ft down current of construction activities ranged from 0-19 NTU on 03 December and 1-2 NTU on 04 December. There were no exceedances of the turbidity criterion during monitoring.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental is presented below. DO ranged from 7.3-8.8 mg/L during the monitoring period.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
03 Dec	0745	7.3	79.6	10.4	31.2	
04 Dec	0730	8.6	91.3	9.6	29.6	

Water Quality/pH Monitoring – pH monitoring has been discontinued until the next phase of concrete placement.

Corps (ENSR) Monitoring – ENSR performed one partial day of oversight on 07 December. No independent monitoring was performed.

Week of 10 Through 15 December

Construction Summary – Modern began placing concrete on Monday, 10 December and continued throughout the week.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on an approximately half-hour schedule during the first two days of concrete placement (10 and 11 December). Monitoring was performed on an approximately 2 hour schedule the remainder of the week. Background (reference) turbidity values ranged from 0-7 NTU. Turbidity measurements at the transect 300 ft down current of construction ranged from 0-7 NTU during the week. There were no exceedances of the turbidity criterion during monitoring.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental is presented below. DO ranged from 6.9-9.9 mg/L during the monitoring period.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
10 Dec	0800	6.9	68.2	7.3	26.8	
11 Dec	0945	8.5	86.8	8.0	29.3	
12 Dec	0715	8.1	83.5	7.9	31.0	

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
Dec						
13 Dec	1015	9.2	94.0	7.9	29.6	
14 Dec	0745	8.1	84.8	9.0	29.5	
15 Dec	0700	8.1	83.1	8.8	27.2	

Water Quality/pH Monitoring – Modern began monitoring for pH this week once concrete placement began. pH ranged from 6.70 to 7.83 at the 300ft compliance point. There were no exceedances of the pH criterion during monitoring.

Corps (ENSR) Monitoring – No oversight or independent monitoring was performed.

Week of 17 Through 22 December

Construction Summary – Addition of concrete over the conduit forced the conduit to bulge upwards near the estuary end of the cofferdam. The area that has bulged-up is above grade, therefore Modern is attempting to push the conduit lower by removing silt under the conduit. This activity continued throughout the week.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on an approximately 2 hour schedule during the week. Background (reference) turbidity values ranged from 1-4 NTU. Turbidity measurements the transect 300 ft down current of construction ranged from 0-4 NTU during the week. There were no exceedances of the turbidity criterion during monitoring.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental is presented below. DO ranged from 7.9-10.1 mg/L during the monitoring period.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
18 Dec	1330	9.3	88.7	6.3	24.8	
19 Dec	0830	7.9	75.1	5.7	26.6	
20 Dec	1015	9.4	90.6	6.5	25.8	
21 Dec	1330	8.7	83.2	5.9	26.7	

Water Quality/pH Monitoring – Modern continued to monitor for pH during the week. pH values ranged from 6.75-7.71. There were no exceedances of the pH criterion during monitoring.

Corps (ENSR) Monitoring – A partial day of oversight was performed on 21 December. No independent monitoring was performed.

Week of 24 Through 29 December

Construction Summary – Modern continued attempts to lower the conduit into place. No work was completed on Christmas Day (25 December).

Com Electric (Modern Continental) Monitoring – Monitoring was performed on a 2 hour schedule on 28 December, the only day monitoring occurred. Background (reference) turbidity was 5 NTU. Turbidity measurements the transect 300 ft down current of construction ranged from 1-14 NTU during the week. There were no exceedances of the turbidity criterion during monitoring.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental is presented below. DO ranged from 9.8-10.3 mg/L on 28 December.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
28 Dec	1100	9.8	90.9	4.2	28.2	

Water Quality/pH Monitoring – Modern continued to monitor for pH this week. pH ranged from 7.09 to 7.71 on 28 December. There were no exceedances of the pH criterion during monitoring.

Corps (ENSR) Monitoring – No oversight or independent monitoring was performed.

Week of 31 December through 5 January

Construction Summary – Modern continued attempts to lower the conduit into place. No work was completed on New Years Day (01 January).

Com Electric (Modern Continental) Monitoring – No monitoring was performed this week. The estuary began to freeze during the week, making monitoring dangerous.

Dissolved Oxygen/Water Quality – No monitoring was performed this week.

Water Quality/pH Monitoring – No monitoring was performed this week.

Corps (ENSR) Monitoring – No oversight or independent monitoring was performed.

Week of 7 Through 12 January

Construction Summary – Modern continued attempts to lower the conduit into place. Due to a period of warmer weather, ice on the estuary cleared.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on an approximately 2 hour schedule. Background (reference) turbidity values ranged from 3-5 NTU. Turbidity measurements the transect 300 ft down current of construction ranged from 3-9 NTU during the week. There were no exceedances of the turbidity criterion during monitoring.

Dissolved Oxygen/Water Quality - A summary of the minimum DO measured by Modern Continental is presented below. DO ranged from 10.0-11.4 mg/L during the monitoring period.

Date	Time	Minimum DO (mg/L)	DO % Saturation	Temp. (°C)	Salinity (ppt)	Notes
07 Jan	1130	10.9	95.0	2.5	25.4	
08 Jan	0900	10.0	88.7	2.0	29.7	

Water Quality/pH Monitoring – No pH monitoring was completed this week., as no concrete placement occurred.

Corps (ENSR) Monitoring – A partial day of oversight was performed on 07 January. No independent monitoring was performed.

Week Beginning 14 January

Construction Summary – Modern performed an NSTAR acceptance test for each of the individual cable conduits by passing a messenger through the entire length of the conduit run from end-to-end. Modern Continental is checking the integrity of the conduit bulkhead before they place the final concrete armor on the conduit; the final surveyed height of the concrete conduit bulkhead at the western terminus of the Phase II alignment is higher than expected. Operations underway to pump material out from under the concrete block in an effort to lower the elevation; the final section of conduit will potentially be armored on Thursday and Friday of this week upon acceptance of the final height of the bulkhead. Backfilling will then occur in the following week in parallel with an ENSR monitoring event.

Com Electric (Modern Continental) Monitoring – Monitoring was not performed during this week. No activities that could cause potential environmental concern were performed during this period.

Corps (ENSR) Monitoring – ENSR performed a partial day of oversight on 16 January. No independent monitoring was performed.

Week Beginning 21 January

Construction Summary – Modern receives USACE acceptance on the final surveyed height of the concrete bulkhead at the western terminus of the Phase II alignment and proceeds with the last concrete pour over the conduit bundle. Concrete was poured on Wednesday and Thursday of this week. ENSR scheduled to perform a monitoring event for the following week (Wednesday, 30 January) for construction activities related to replacing excavated materials over the conduit trench. Material handling per the Modern Project Manager was scheduled to begin at the end of this reporting week.

Com Electric (Modern Continental) Monitoring – Limited monitoring associated with the placement of concrete materials was planned, but the timing of the pour (late afternoon into the evening) precluded monitoring due to the H&S guidelines that strictly limits nighttime boat operations.

Corps (ENSR) Monitoring – ENSR performed a partial day of oversight on 25 January. No independent monitoring was performed.

Week Beginning 28 January

Construction Summary – The replacement of excavated materials into the trench is delayed pending approval from the USACE on the final surveyed height of the concrete cap and bulkhead. ENSR monitoring that was scheduled for Wednesday was cancelled; a survey crew from NSTAR was on-site taking elevation measurements of the concrete bulkhead which reportedly had sank to a lesser elevation

than recorded previously. Modern was removing center sheet pile at the Phase II shore landing and performing general cleaning and grading in the area. Approval to proceed was received on Wednesday and a limited scale effort to move excavated material was begun to facilitate sheet pile removal. Modern Continental resumed water quality monitoring at this point.

Com Electric (Modern Continental) Monitoring – Monitoring resumed during this week. All turbidity values recorded downstream of construction activities were 10NTU or less. There were no exceedances of the turbidity criterion during monitoring.

Corps (ENSR) Monitoring – ENSR performed a partial day of oversight on 30 January. No independent monitoring was performed.

Week Beginning 04 February

Construction Summary – Modern continues efforts to remove and pressure wash sheet piles from the center sheet pile bulkhead. Materials handling to replace excavated materials back into the conduit trench proceeds through the week. Modern removed the bulkhead at the western edge of the Phase II alignment on Friday, 08 February after receiving the results of the toxicity testing for cell contents. P. L'Heureux accompanied J. Almeida during water quality monitoring; no turbidity plume was detected. No additional outer sheet piles were removed during the remainder of the week. Construction was performed on Saturday, 09 February, activities consisted of removing sand, stockpiled in a containment cell at the eastern edge of the larger conduit trench, and placing materials on-shore for use by NSTAR for cable trenching activities. According to P.L'Heureux, these sand materials were previously tested and found to be free of contamination.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on an approximate 2-hour schedule. Background (reference) turbidity values were less than 5 NTU. Turbidity measurements at the transect 300 ft down current of construction ranged from 3-9 NTU during the week. There were no exceedances of the turbidity criterion during monitoring.

Corps (ENSR) Monitoring – ENSR water quality monitoring was performed on Monday, 04 February during the afternoon ebb tide. The event was scheduled to capture water column conditions during the replacement of excavated materials in the conduit trench. Material handling and center sheet pile removals were being conducted on this day. A two-hour composite sample was collected for chemistry and acute toxicity from two stations, Station 2 at the Coggeshall Street Bridge and from a point located 300' down current; a suite of reference samples was collected from a point 1000' up current prior to the event. In addition to the collection of open water samples as part of the standard ebb tide monitoring event, a grab sample of cell contents for chemistry and acute toxicity was collected from within the sheet pile wall; this sample was intended to represent a worst case release from the cell. The grab sample from within the cell was to be proved non-toxic prior to the removal of outer sheet piles. Acute toxicity testing using the Mysid shrimp and sea urchin fertilization was performed on all the samples collected; the chemistry samples were archived pending results of the toxicity testing. The acute toxicity testing performed by ESI resulted in 100% survival for each of the three samples. These analytical results were provided to P. L'Heureux (USACE) in New Bedford on Thursday, 07 February who forwarded an authorization to Modern Continental to proceed with sheet pile removals. No further ENSR water quality monitoring events are formally scheduled in support of Com Electric construction activities.

Please contact Jay Mackay or Steve Wolf if you have questions or comments.

Jay Mackay – U.S. Army Corps of Engineers
(978) 318-8142; joseph.b.mackay@usace.army.mil

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934

Update 20 – 11 March 2002 - Water Quality Monitoring
New Bedford Harbor Superfund Site – Com Electric Conduit Crossing

Week Beginning 11 February

Construction Summary – Modern continues efforts to remove and pressure wash sheet piles from the Phase II alignment. Field samples collected from within the confines of the outer sheet pile wall were tested for toxicity prior to allowing the release of construction impacted waters to the Upper Harbor (see Update #19); acceptable survivorship results were obtained. J. Almeida (Modern Continental) continues water quality monitoring during sheet pile removal; no turbidity plume was detected.

Com Electric (Modern Continental) Monitoring – Monitoring was performed on an approximate 2-hour schedule. Background (reference) turbidity values were less than 5 NTU. Turbidity values measured along the transect 300 feet down current of construction ranged from 3-10 NTU during the week. There were no exceedances of the turbidity criterion during monitoring.

Corps (ENSR) Monitoring – No further ENSR water quality monitoring events are formally scheduled in support of Com Electric construction activities.

Week Beginning 18 February through the Week of 11 March

Construction Summary – Modern continues efforts to remove and pressure wash sheet piles from the Phase II alignment. Removed sheets were loaded to the materials handling barge and offloaded at the site of the shore landing for Phase I (along the west side of the estuary). The last sheet pile was removed from the estuary on Thursday, 07 March.

The crane used for sheet pile work was removed from the site on 08 March. The materials handling barge was removed from the Upper Harbor on 12 March. The remaining barges and equipment, including the excavator, are scheduled to depart the Upper Harbor pending USACE acceptance of the as-built sediment elevation along the cable corridor. Additional grading of sediment will be required to remove dangerous shoal areas - those with water depths less than 2 feet at low tide.

Com Electric (Modern Continental) Monitoring – J. Almeida (Modern Continental) continued water quality monitoring on a 2-hour schedule during the entire sheet pile removal effort; no turbidity plume was detected. Background (reference) turbidity values were less than 5 NTU. Turbidity values measured along the transect 300 feet down current of construction ranged from less than 5 NTU – 12 NTU during the removal effort. The turbidity criterion was not exceeded during sheet pile removal operations.

Water quality monitoring performed by the Contractor was discontinued on 07 March.

Corps (ENSR) Monitoring – No further ENSR water quality monitoring events are formally scheduled in support of Com Electric construction activities.

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Jay Mackay – U.S. Army Corps of Engineers
(978) 318-8142; joseph.b.mackay@usace.army.mil

Steve Wolf - ENSR International
direct # (978) 589-3187; swolf@ensr.com
cell # (978) 758-2498; home # (978) 263-6934



Appendix E

Results of Toxicity Testing and PCB Congener Analysis

Date: 19-Apr-01
Level: 1
Event: 1

Organism	Endpoint	Duration	Type	Units	Results:Ebb 1			Percent of Background (Reference)	
					Background	NBCE1	NBCE2	NBCE1	NBCE2
					E1-D1-EREF	E1-D1-NBCE1	E1-D1-NBCE2	E1-D1-NBCE1	E1-D1-NBCE2
Arbacia punctulata	Fertilization	24-hr	acute	%	87	87.8	87.7	101%	101%
Champia parvula	Survival	48-hr	acute	%	100	100	100	100%	100%
	Cytocarp Prod.	7-day	chronic	#/branch	1.3	1.1	0.95	85%	73%
Americamysis bahia	Survival	48-hr	acute	%	100	100	100	100%	100%
	Survival	7-day	chronic	%	82.5	97.5	80	118%	97%
	Weight	7-day	chronic	wt(mg)/org.	0.282	0.393	0.251	139%	89%

Chronic result <80%

Date: 20-Apr-01

Level: 1

Event: 1

Organism	Endpoint	Duration	Type	Units	Results:Ebb 2			Percent of Background (Reference)	
					Background	NBCE1	NBCE2	NBCE1	NBCE2
					E1-D2-EREF	E1-D2-NBCE1	E1-D2-NBCE2	E1-D2-NBCE1	E1-D2-NBCE2
Arbacia punctulata	Fertilization	24-hr	acute	%	84.4	89.6	82	106%	97%
Champia parvula	Survival	48-hr	acute	%	100	100	100	100%	100%
	Cytocarp Prod.	7-day	chronic	#/branch	0.85	0.8	0.75	94%	88%
Americamysis bahia	Survival	48-hr	acute	%	100	100	100	100%	100%
	Survival	7-day	chronic	%	100	100	100	100%	100%
	Weight	7-day	chronic	wt(mg)/org.	0.303	0.306	0.283	101%	93%

Date: 24-Apr-01

Level: 1

Event: 1

Organism	Endpoint	Duration	Type	Units	Results:Ebb 1			Percent of Background (Reference)	
					Background	NBCE1	NBCE2	NBCE1	NBCE2
Arbacia punctulata	Fertilization	24-hr	acute	%	85.7	84.7	82.7	99%	96%
Champia parvula	Survival	48-hr	acute	%	100	100	100	100%	100%
	Cytocarp Prod.	7-day	chronic	#/branch	1	3.35	7	335%	700%
Americamysis bahia	Survival	48-hr	acute	%	97.5	100	95	103%	97%
	Survival	7-day	chronic	%	80	83	83	104%	104%
	Weight	7-day	chronic	wt(mg)/org.	0.362	0.453	0.391	125%	108%

Date: 27-Apr-01

Level: 2

Event: 2

Organism	Endpoint	Duration	Type	Units	Results: Flood Tide		Percent of Background (Reference)
					Background	NBCE3	NBCE3
Arbacla punctulata	Fertilization	24-hr	acute	%	82.3	81	98%
Champia parvula	Survival	48-hr	acute	%	100	100	100%
Americamysis bahia	Survival	48-hr	acute	%	100	100	100%

Date: 3-May-01
 Level: 4
 Event: 1

Organism	Endpoint	Duration	Type	Units	Results:Ebb 1		Percent of Background (Reference)
					Background	NBCE1	
<i>Arbacia punctulata</i>	Fertilization	24-hr	acute	%	82.2	83.1	101%
<i>Champia parvula</i>	Survival	48-hr	acute	%	100	100	100%
<i>Americamysis bahia</i>	Survival	48-hr	acute	%	100	100	100%

Date: 8-May-01

Level: 4

Event: 1

Organism	Endpoint	Duration	Type	Units	Results:Ebb 1		Percent of Background (Reference)
					Background	NBCE2	NBCE2
Arbacia punctulata	Fertilization	24-hr	acute	%	84.3	72.4	86%
Champia parvula	Survival	48-hr	acute	%	100	100	100%
Americamysis bahia	Survival	48-hr	acute	%	100	98	98%

Date: 22-May-01
Level: 1
Event: 1

Organism	Endpoint	Duration	Type	Units	Results: South Bay Cell Contents		Percent of Laboratory Control
					Lab control	Cell contents	Cell contents
<i>Arbacia punctulata</i>	Fertilization	24-hr	acute	%	87.1	87.1	100%
<i>Champia parvula</i>	Survival	48-hr	acute	%	100	100	100%
<i>Americamysis bahia</i>	Survival	48-hr	acute	%	92.5	92.5	100%

Date: 23-May-01

Level: 1

Event: 1

Organism	Endpoint	Duration	Type	Units	Results: South Bay Ebb Cell Contents		Percent of Laboratory Control
					Lab control	Ebb Cell contents	Ebb Cell contents
<i>Arbacia punctulata</i>	Fertilization	24-hr	acute	%	84.4	84.9	101%
<i>Champia parvula</i>	Survival	48-hr	acute	%	100	100	100%
<i>Americamysis bahia</i>	Survival	48-hr	acute	%	95	97.5	103%

Date: 19-Jun-01
Level: 1
Event: 1

Organism	Endpoint	Duration	Type	Units	Results:Ebb 1			Percent of Background (Reference)	
					Background	NBCE1	NBCE2	NBCE1	NBCE2
					E5-D1-EREF	E5-D1-NBCE1	E5-D1-NBCE2	E5-D1-NBCE1	E5-D1-NBCE2
Arbacia punctulata	Fertilization	24-hr	acute	%	81.1	80.2	80.7	99%	100%
Champia parvula	Survival	48-hr	acute	%	100	100	100	100%	100%
	Cytocarp Prod.	7-day	chronic	#/branch	0.35	0.7	3.65	200%	1043%
Americamysis bahia	Survival	48-hr	acute	%	100	97.5	100	98%	100%
	Survival	7-day	chronic	%	100	97.5	87.5	98%	88%
	Weight	7-day	chronic	wt(mg)/org.	0.47	0.445	0.356	95%	76%

Chronic result <80%

Date: 20-Jun-01

Level: 1

Event: 1

Organism	Endpoint	Duration	Type	Units	Results:Ebb 2			Percent of Background (Reference)	
					Background	NBCE1	NBCE2	NBCE1	NBCE2
					E5-D2-EREF	E5-D2-NBCE1	E5-D2-NBCE2	E5-D2-NBCE1	E5-D2-NBCE2
Arbacia punctulata	Fertilization	24-hr	acute	%	90	91.1	89.7	101%	100%
Champia parvula	Survival	48-hr	acute	%	100	100	100	100%	100%
	Cytocarp Prod.	7-day	chronic	#/branch	0.65	4.3	1.86	662%	286%
Americamysis bahia	Survival	48-hr	acute	%	100	97.5	100	98%	100%
	Survival	7-day	chronic	%	97.5	95	97.5	97%	100%
	Weight	7-day	chronic	wt(mg)/org.	0.454	0.376	0.394	83%	87%

Date: 21-Jun-01
 Level: 1
 Event: 5

Organism	Endpoint	Duration	Type	Units	Results:Flood		Percent of Background (Reference)
					Background	NBCE3	NBCE3
					E5-D3-FREF	E5-D3-NBCE3	E5-D3-NBCE3
Arbacia punctulata	Fertilization	24-hr	acute	%	87.2	88.3	101%
Champia parvula	Survival	48-hr	acute	%	100	100	100%
	Cytocarp Prod.	7-day	chronic	#/branch	2.05	3.2	156%
Americamysis bahia	Survival	48-hr	acute	%	92.5	85	92%
	Survival	7-day	chronic	%	80	75	94%
	Weight (a)	7-day	chronic	wt(mg)/org.	0.6185	0.335	54%

Chronic result <80%

(a) Replicates B, C, and F had noticeable salt crystals that are the likely cause of the high weight in the Background test. The laboratory documented this and will report results to include an average weight (0.302 mg/organism) without these replicates.

Date: 27-Jun-01
Level: 4
Event: 6

Organism	Endpoint	Duration	Type	Units	Results: Ebb		Percent of Background (Reference)
					Background	NBCE2	
					E6-D1-EREF	E6-D1-NBCE2	E5-D3-NBCE2
Arbacia punctulata	Fertilization	24-hr	acute	%	81.9	82.1	100%
Champia parvula	Survival	48-hr	acute	%	100	100	100%
Americamysis bahia	Survival	48-hr	acute	%	100	97.5	98%

Date: 10-Jul-01
Level: 1
Event: 7

Organism	Endpoint	Duration	Type	Units	Results:Ebb 1			Percent of Background (Reference)	
					Background	NBCE1	NBCE2	NBCE1	NBCE2
					E7-D1-EREF	E7-D1-NBCE1	E7-D1-NBCE2	E7-D1-NBCE1	E7-D1-NBCE2
Arbacia punctulata	Fertilization	24-hr	acute	%	50.3	48.2	55.1	96%	110%
Champia parvula	Survival	48-hr	acute	%	100	100	100	100%	100%
	Cytocarp Prod.	7-day	chronic	#/branch	19.55	22.6	20.9	116%	107%
Americamysis bahia	Survival	48-hr	acute	%	100	100	100	100%	100%
	Survival	7-day	chronic	%	100	97.5	97.5	98%	98%
	Weight	7-day	chronic	wt(mg)/org.	0.419	0.451	0.364	108%	87%

Date: 10-Jul-01 Champia only Re-test
Level: 1
Event: 7

Organism	Endpoint	Duration	Type	Units	Results:Ebb 1			Percent of Background (Reference)	
					Background	NBCE1	NBCE2	NBCE1	NBCE2
					E7-D1-EREF	E7-D1-NBCE1	E7-D1-NBCE2	E7-D1-NBCE1	E7-D1-NBCE2
Champia parvula	Survival Cytocarp Prod.	48-hr 7-day	acute chronic	% #/branch	100 14.6	100 17.8	100 13.5	100% 122%	100% 92%

Date: 24-Jul-01
Level: 1
Event: 8

Organism	Endpoint	Duration	Type	Units	Results:Ebb 1			Percent of Background (Reference)	
					Background	NBCE1	NBCE2	NBCE1	NBCE2
					E8-D1-EREF	E8-D1-NBCE1	E8-D1-NBCE2	E8-D1-NBCE1	E8-D1-NBCE2
Arbacia punctulata	Fertilization	24-hr	acute	%	87.2	85.6	85.7	98%	98%
Champia parvula	Survival	48-hr	acute	%	100	100	100	100%	100%
	Cytocarp Prod.	7-day	chronic	#/branch	11.3	12.65	12.15	112%	108%
Americamysis bahia	Survival	48-hr	acute	%	100	100	100	100%	100%
	Survival	7-day	chronic	%	100	97.5	100	98%	100%
	Weight	7-day	chronic	wt(mg)/org.	0.301	0.218	0.253	72%	84%

Chronic result <80%

Date: 24-Jul-01
Level: 1
Event: 8

Organism	Endpoint	Duration	Type	Units	Results:Flood		Percent of Background (Reference)
					Background	NBCE3	NBCE3
					E8-D1-FREF	E8-D1-NBCE3	E8-D1-NBCE3
Arbacia punctulata	Fertilization	24-hr	acute	%	86.1	88.1	102%
Champia parvula	Survival	48-hr	acute	%	100	100	100%
	Cytocarp Prod.	7-day	chronic	#/branch	12.2	7.5	61%
Americamysis bahia	Survival	48-hr	acute	%	100	100	100%
	Survival	7-day	chronic	%	100	95	95%
	Weight	7-day	chronic	wt(mg)/org.	0.274	0.242	88%

Chronic result <80%

Date: 17-Aug-01
Level: 4
Event: 9

Organism	Endpoint	Duration	Type	Units	Results: South Bay Ebb Cell Contents		Percent of Laboratory Control
					Lab control	Ebb Cell contents	Ebb Cell contents
<i>Arbacia punctulata</i>	Fertilization	24-hr	acute	%	86.1	86.1	100%
<i>Champia parvula</i>	Survival	48-hr	acute	%	100	100	100%
<i>Americamysis bahia</i>	Survival	48-hr	acute	%	100	100	100%

Date: 23-Aug-01
 Level: 4
 Event: 10

Organism	Endpoint	Duration	Type	Units	Results: South Bay Ebb Cell Contents		Percent of Laboratory Control
					Lab control	Ebb Cell contents	Ebb Cell contents
<i>Arbacia punctulata</i>	Fertilization	24-hr	acute	%	86.7	88.2	102%
<i>Champia parvula</i>	Survival	48-hr	acute	%	100	100	100%
<i>Americamysis bahia</i>	Survival	48-hr	acute	%	100	100	100%

Date: 20-Sep-01
 Level: 1
 Event: 1

Organism	Endpoint	Duration	Type	Units	Results: Ebb 1				Percent of Background (Reference)	
					Background	Lab Control	NBCE1	NBCE2	NBCE1	NBCE2
Arbacia punctulata	Fertilization	24-hr	acute	%	87.1	87.2	86.6	87.2	99%	100%
Champia parvula	Survival	48-hr	acute	%	100	100	100	100	100%	100%
Americamysis bahia	Survival	48-hr	acute	%	100	100	95	100	95%	100%

Date: 4-Feb-02
 Level: 1
 Event: 1

Organism	Endpoint	Duration	Type	Units	Results: Ebb 1					Percent of Laboratory Control	Percent of Background (Reference)	
					Background	Lab Control	Cell Contents	NBCE1	NBCE2	Cell Contents	NBCE1	NBCE2
Arbacia punctulata	Fertilization	24-hr	acute	%	97.8	95.8	96	98	92.8	100%	100%	95%
Champia parvula	Survival	48-hr	acute	%	100	100	100	100	100	100%	100%	100%
Americamysis bahia	Survival	48-hr	acute	%	100	100	100	100	100	100%	100%	100%



**New Bedford Harbour - Com-Electric Line Installation
Water Quality Monitoring Results - Dissolved PCB Congeners (ug/l)**

Date: 4/19/01

Tide: Ebb

Sample Location: EREF

Sample ID: E1-D1-EREF

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.055	0.15	0.12	0.021	0.066	0.018	0.009	0.001 U	0.005	0.001 U	0.002	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE1

Sample ID: E1-D1-NBCE-1

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.045	0.12	0.098	0.017	0.050	0.014	0.008	0.001 U	0.004	0.001 U	0.002	0.003	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE2

Sample ID: E1-D1-NBCE-2

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.029	0.086	0.054	0.013	0.040	0.011	0.006	0.001 U	0.004	0.001 U	0.002	0.003	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

U: Analyte not detected above indicated method detection limit.



**New Bedford Harbour - Com-Electric Line Installation
Water Quality Monitoring Results - Dissolved PCB Congeners (ug/l)**

Date: 4/20/01

Tide: Ebb

Sample Location: EREF

Sample ID: E1-D2-EREF

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.045	0.14	0.045	0.023	0.066	0.017	0.009	0.002	0.005	0.001 U	0.002	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE1

Sample ID: E1-D2-NBCE-1

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.15	0.34	0.099	0.056	0.13	0.033	0.018	0.002	0.007	0.001 U	0.003	0.007	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE2

Sample ID: E1-D2-NBCE-2

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.029	0.087	0.031	0.015	0.046	0.013	0.007	0.001 U	0.004	0.001 U	0.001	0.003	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

U: Analyte not detected above indicated method detection limit.



**New Bedford Harbour - Com-Electric Line Installation
Water Quality Monitoring Results - Dissolved PCB Congeners (ug/l)**

Date: 4/24/01

Tide: Ebb

Sample Location: EREF

Sample ID: E2-D1-EREF

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.089	0.28	0.075	0.037	0.094	0.029	0.016	0.001	0.010	0.001	0.004	0.010	0.002	0.002	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE1

Sample ID: E2-D1-NBCE-1

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.059	0.17	0.051	0.030	0.077	0.024	0.014	0.002	0.009	0.001 U	0.004	0.008	0.001 U	0.002	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE2

Sample ID: E2-D1-NBCE-2

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.014	0.047	0.013	0.009	0.021	0.006	0.005	0.001	0.003	0.001 U	0.001	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

U: Analyte not detected above indicated method detection limit.



**New Bedford Harbour - Com-Electric Line Installation
Water Quality Monitoring Results - Dissolved PCB Congeners (ug/l)**

Date: 4/27/01

Tide: Flood

Sample Location: FREF

Sample ID: E2-D3-FREF

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.046	0.081	0.084	0.025	0.051	0.018	0.012	0.001 U	0.005	0.001 U	0.002	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE3

Sample ID: E2-D3-NBCE-3

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.062	0.097	0.10	0.030	0.060	0.018	0.011	0.001 U	0.008	0.001 U	0.002	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

U: Analyte not detected above indicated method detection limit.



**New Bedford Harbour - Com-Electric Line Installation
Water Quality Monitoring Results - Dissolved PCB Congeners (ug/l)**

Date: 5/3/01 Tide: Ebb

Sample Location: EREF

Sample ID: E3-D1-EREF

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.057	0.13	0.081 J	0.040	0.073	0.027	0.016	0.001	0.008	0.001 U	0.003	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE1

Sample ID: E3-D1-NBCE-1

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.048	0.18	0.16	0.050	0.10	0.044	0.021	0.002	0.011	0.001 U	0.004	0.010	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

U: Analyte not detected above indicated method detection limit.



**New Bedford Harbour - Com-Electric Line Installation
Water Quality Monitoring Results - Dissolved PCB Congeners (ug/l)**

Date: 5/22/01

Tide: Ebb

Sample Location: CELL-GRAB

Sample ID: Cell Contents

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 163	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.18	0.18	0.19	0.060	0.095	0.024	0.017	0.001 U	0.009	0.001 U	0.002	0.007	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

U: Analyte not detected above indicated method detection limit.



**New Bedford Harbour - Com-Electric Line Installation
Water Quality Monitoring Results - Dissolved PCB Congeners (ug/l)**

Date: 5/23/01

Tide: Ebb

Sample Location: CELL-COMP

Sample ID: Ebb Cell Composi

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 208	BZ 209
0.15	0.17	0.14	0.048	0.089	0.022	0.012	0.001 U	0.006	0.001 U	0.002	0.005	0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

U: Analyte not detected above indicated method detection limit.



**New Bedford Harbour - Com-Electric Line Installation
Water Quality Monitoring Results - Dissolved PCB Congeners (ug/l)**

Date: 6/19/01

Tide: Ebb

Sample Location: EREF

Sample ID: E5-D1-EREF

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.046	0.073	0.047	0.039	0.060	0.016	0.010	0.002	0.007	0.001	0.003	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE1

Sample ID: E5-D1-NBCE1

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.61	0.76	0.34	0.14	0.29	0.078	0.030	0.005	0.018	0.002	0.007	0.015	0.002	0.002	0.001	0.001 U	0.001 U	0.001 U

Sample Location: NBCE2

Sample ID: E5-D1-NBCE2

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.044	0.075	0.043	0.024	0.045	0.017	0.011	0.002	0.007	0.001	0.003	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

U: Analyte not detected above indicated method detection limit.



**New Bedford Harbour - Com-Electric Line Installation
Water Quality Monitoring Results - Dissolved PCB Congeners (ug/l)**

Date: 6/20/01

Tide: Ebb

Sample Location: EREF

Sample ID: E5-D2-EREF

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.11	0.18	0.11	0.061	0.13	0.044	0.025	0.003	0.015	0.002 U	0.005	0.013	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U

Sample Location: NBCE1

Sample ID: E5-D2-NBCE1

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.33	0.39	0.15	0.11	0.17	0.056	0.030	0.004	0.016	0.002	0.005	0.012	0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE2

Sample ID: E5-D2-NBCE2

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.079	0.089	0.052	0.031	0.062	0.023	0.014	0.002	0.009	0.001 U	0.003	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

U: Analyte not detected above indicated method detection limit.



**New Bedford Harbour - Com-Electric Line Installation
Water Quality Monitoring Results - Dissolved PCB Congeners (ug/l)**

Date: 6/21/01

Tide: Flood

Sample Location: FREF

Sample ID: E5-D3-FREF

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.15	0.18	0.10	0.053	0.10	0.029	0.016	0.002	0.008	0.001 U	0.002	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE3

Sample ID: E5-D3-NBCE3

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.30	0.33	0.14	0.091	0.15	0.049	0.025	0.003	0.012	0.001 U	0.003	0.008	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

U: Analyte not detected above indicated method detection limit.



**New Bedford Harbour - Com-Electric Line Installation
Water Quality Monitoring Results - Dissolved PCB Congeners (ug/l)**

Date: 6/27/01

Tide: Ebb

Sample Location: EREF

Sample ID: E6-D1-EREF

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 208	BZ 209
0.14	0.19	0.086	0.039	0.078	0.023	0.013	0.001 U	0.004	0.001 U	0.002	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE1

Sample ID: E6-D1-NBCE1

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 208	BZ 209
0.12	0.13	0.058	0.036	0.065	0.018	0.011	0.001	0.005	0.001 U	0.002	0.003	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE2

Sample ID: E6-D1-NBCE2

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 208	BZ 209
0.028	0.046	0.024	0.012	0.025	0.007	0.004	0.001 U	0.002	0.001 U	0.001 U	0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

U: Analyte not detected above indicated method detection limit.



**New Bedford Harbour - Com-Electric Line Installation
Water Quality Monitoring Results - Dissolved PCB Congeners (ug/l)**

Date: 7/10/01

Tide: Ebb

Sample Location: CELL-COMP

Sample ID: E7-CellContents

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.64	0.45	0.40	0.12	0.14	0.062	0.031	0.003	0.013	0.001 U	0.002	0.008	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: EREF

Sample ID: E7-D1-EREF

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.21	0.19	0.17	0.043	0.075	0.028	0.012	0.002	0.004	0.001 U	0.002	0.003	0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE1

Sample ID: E7-D1-NBCE1

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.23	0.27	0.20	0.057	0.088	0.030	0.016	0.001 U	0.007	0.001 U	0.002	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE2

Sample ID: E7-D1-NBCE2

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.078	0.073	0.084	0.020	0.037	0.012	0.006	0.001 U	0.003	0.001 U	0.001 U	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

U: Analyte not detected above indicated method detection limit.



**New Bedford Harbour - Com-Electric Line Installation
Water Quality Monitoring Results - Dissolved PCB Congeners (ug/l)**

Date: 7/17/01

Tide: Ebb

Sample Location: CELL-GRAB

Sample ID: CellContents_071

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.60	0.48	0.14	0.12	0.15	0.054	0.026	0.002	0.011	0.001 U	0.001	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

U: Analyte not detected above indicated method detection limit.



**New Bedford Harbour - Com-Electric Line Installation
Water Quality Monitoring Results - Dissolved PCB Congeners (ug/l)**

Date: 7/24/01

Tide: Ebb

Sample Location: EREF

Sample ID: E8-D1-EREF

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.17	0.17	0.087	0.048	0.068	0.021	0.011	0.002	0.006	0.001 U	0.002	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE1

Sample ID: E8-D1-NBCE1

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.20	0.23	0.081	0.055	0.079	0.025	0.014	0.001	0.007	0.001 U	0.003	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: NBCE2

Sample ID: E8-D1-NBCE2

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.080	0.10	0.044	0.029	0.048	0.014	0.008	0.001 U	0.005	0.001 U	0.001	0.003	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Sample Location: FREF

Sample ID: E8-D1-FREF

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.25	0.28	0.24	0.080	0.12	0.042	0.023	0.002 U	0.022	0.002 U	0.003	0.007	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U

Sample Location: NBCE3

Sample ID: E8-D1-NBCE3

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.25	0.28	0.12	0.083	0.12	0.039	0.021	0.002 U	0.011	0.002 U	0.004	0.008	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U

U: Analyte not detected above indicated method detection limit.



**New Bedford Harbour - Com-Electric Line Installation
Water Quality Monitoring Results - Dissolved PCB Congeners (ug/l)**

Date: 8/17/01

Tide: Ebb

Sample Location: CELL-GRAB

Sample ID: Cell_Aug17

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.51	0.35	0.13	0.098	0.13	0.047	0.021	0.002	0.022	0.001	0.006	0.017	0.002	0.002	0.001 U	0.001 U	0.001	0.001 U

U: Analyte not detected above indicated method detection limit.



New Bedford Harbour - Com-Electric Line Installation
Water Quality Monitoring Results - Dissolved PCB Congeners (ug/l)

Date: 8/23/01

Tide: Ebb

Sample Location: CELL-GRAB

Sample ID: 082301-Cell Conte

BZ 8	BZ 18	BZ 28	BZ 44	BZ 52	BZ 66	BZ 101	BZ 105	BZ 118	BZ 128	BZ 138	BZ 153	BZ 170	BZ 180	BZ 187	BZ 195	BZ 206	BZ 209
0.95	0.44	0.39	0.12	0.17	0.068	0.027	0.001	0.014	0.001 U	0.003	0.008	0.001 U	0.001 U	0.002	0.001 U	0.001 U	0.011 U

U: Analyte not detected above indicated method detection limit.